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TECHNICAL MANUAL

for

ANTENNA GROUP
AN/SRA-17A

Manufactured By

LIECO INC.
130 EILEEN WAY
SYOSSET, N.Y.

DEPARTMENT OF THE NAVY

BUREAU OF SHIPS

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From: Chief, Bureau of Ships
To: All Activities concerned with the Installation, Operation, and Maintenance of the Subject Equipment

Subj: Technical Manual for Antenna Group AN/SRA-17A, NAVSHIPS 93679

1. This is the Technical Manual for the subject equipment and is in effect upon receipt.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

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Chief of Bureau

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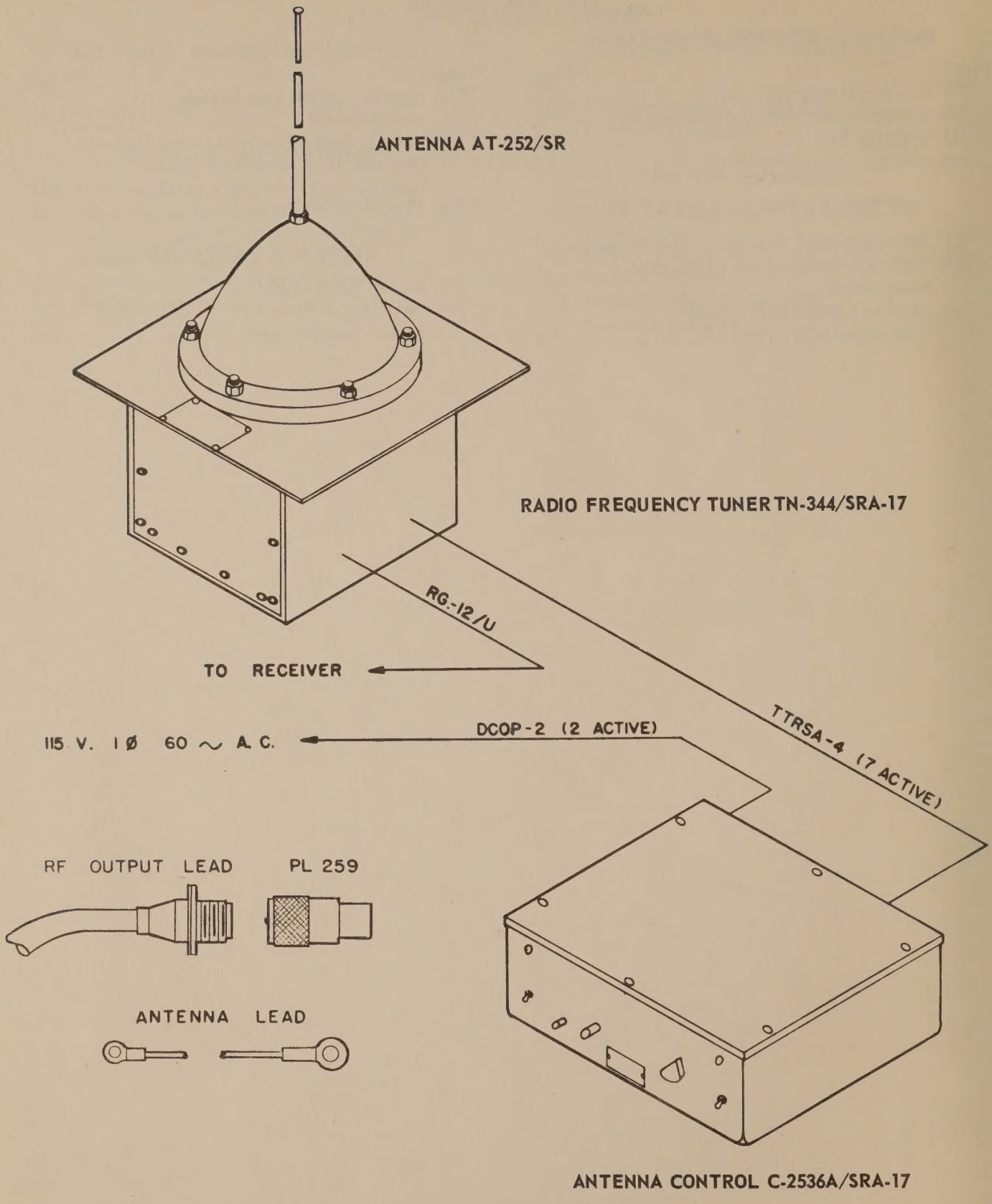


Figure 1-1. Antenna Group AN/SRA-17A

SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION.

This Technical Manual covers the theory, installation and maintenance of Antenna group AN/SRA-17A.

1-2. FUNCTIONAL DESCRIPTION.

Antenna Group AN/SRA-17A provides a physically small, but efficient receiving antenna covering the VLF-LF frequency range, for installations where interaction between large, closely spaced antennae would present a problem, and on smaller craft where space for a long wire antenna is not available.

b. GENERAL. Antenna Group AN/SRA-17A (fig. 1-1) consists of one 10½ foot vertical whip antenna, one radio frequency tuner, and one antenna control unit.

c. ANTENNA AT-252/SR. The antenna consists of a 10½ foot stainless-steel tubular whip and its mounting. The assembly is a complete unit, Navy type AT-252/SR, modified to include a ½ inch steel ball at the top of antenna. The antenna mounts on a 12-inch square steel plate which forms part of the radio frequency tuner housing. The antenna is connected to a Navy type RBA or AN/SRR-11 receiver by a 72 ohm cable (not furnished).

d. RADIO FREQUENCY TUNER TN-344/SRA-17. The radio frequency tuner consists of two variable inductors (Increductors) and a silicon diode noise source, plus associated relays for switching the proper inductors and noise source into the circuit. The noise source is used as a tuning aid, since the antenna control has no calibrated dial. The tuner is mounted on a small chassis which fits into the radio frequency tuner housing.

e. ANTENNA CONTROL C-2536A/SRA-17. The antenna control unit provides a regulated d.c. power supply for the operation of the relays and variable inductors in the radio frequency tuner unit. The antenna control unit is located at the receiver position, thus enabling the operator to tune the antenna from this remote location. Interconnection is made to the radio frequency tuner unit by a control cable (not furnished).

1-3. QUICK REFERENCE DATA.

a. Frequency range	14kc - 600kc
(1) Tuning Bands	band 1: 14kc - 38kc band 2: 38kc - 95kc band 3: 95kc - 235kc band 4: 235kc - 600 kc
b. Type of frequency adjustment.	Frequency is adjusted by varying the dc current thru the variable inductors by means of potentiometer R6.
c. Antenna impedance	72 ohms.
d. Sensitivity	20 db signal to noise ratio minimum sensitivity.

RBA Band 1 - 15kc - 13.4 Microvolts.
25kc - 10.8 Microvolts.
38kc - 12.9 Microvolts.
Band 2 - 38kc - 5.1 Microvolts.
65kc - 5.0 Microvolts.
95kc - 5.7 Microvolts.
Band 3 - 95kc - 5.0 Microvolts.
165kc - 4.6 Microvolts.
235kc - 5.6 Microvolts.
Band 4 - 235kc - 3.1 Microvolts.
420kc - 3.0 Microvolts.
600kc - 4.2 Microvolts.

TABLE 1-1. EQUIPMENT SUPPLIED

QUANTITY PER EQUIPMENT	NOMENCLATURE		OVERALL DIMENSIONS*				
	Name	Designation	Height	Width	Depth	Volume*	Weight*
1	Antenna Control	C-2536A/SRA-17	4½	12½	12	.892	14
1	Radio Frequency Tuner and housing	TN-344/SRA-17	10½	12	12	.904	22
1	Antenna	AT-252/SR	131	7 dia.	at widest point		20
1	Connector	AN3106A-14S-9S					
1	Connector	AN3106A-18-8P					
1	UHF Connector	PL-259,49190					
1	UHF Connector	SO-239,49194					
1	UHF Shield	UG-106/U,M-360					
2	Technical Manual	NAVSHIPS 93679					

*Unless otherwise stated, dimensions are in inches, volume in cubic feet, weight in pounds.

e. Operating characteristic of power supply 117 Volts AC 60 cps single phase.

1-4. EQUIPMENT LISTS.

A list of equipment supplied is contained in Table 1-1. Table 1-2 lists equipment required but not supplied. Shipping data on equipment and publications supplied is given in Table 1-3. Electron tube complement is contained in Table 1-4.

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QUANTITY PER EQUIPMENT	NOMENCLATURE		REQUIRED USE	REQUIRED CHARACTERISTICS
	Name	Designation		
1	Coaxial Cable	RG-12U	Connect radio frequency tuner to receiver	Length as required at installation
1	Power Cable	DCOP-2	Connect antenna control to power supply	Length as required at installation
1	G.R. type* female connector	NT49121-A	Fitting for RG 12/U cable	
1	Control Cable	TTRSA-4	Connect output of antenna control to radio frequency tuner input	8-conductor shielded cable length as required at installation

*For RBA receivers, Type N for AN/SRR-11

TABLE 1-3. SHIPPING DATA

BOX NUMBER	NOMENCLATURE		OVERALL DIMENSIONS				
	Name	Designation	Height	Width	Depth	Volume*	Weight*
1	Antenna Control Radio Frequency tuner	C-2536/SRA-17 TN-344/SRA-17A	24½	15	15	3.12	100
2	Whip Antenna	AT 252/SR	6	6	10½ ft.	.219	35

*Unless otherwise noted, dimensions are in inches, volume in cubic feet, and weight in pounds; equipment crated and ready for shipment.

TABLE 1-4. ELECTRON TUBE COMPLEMENT

UNIT	NUMBER OF TUBES OF TYPES INDICATED	
	5Y3 WGTA	VR 105
Antenna Control	1	1

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

Antenna AT-252/SR is secured in its crate by small wood blocks. All nails securing these blocks must be removed before attempting to lift the antenna from the crate.

2-2. SITE SELECTION.

Antenna Group AN/SRA-17A is designed for shipboard installation. For optimum performance Antenna AT-252/SR and the radio frequency tuner should be mounted in a clear space near the top of a mast, king post, stack or other vertical portion of the superstructure. Vertical mounting of the antenna is necessary as insulator bowl may be strained when the antenna is mounted in a horizontal position. The antenna control unit is installed in the radio room directly above the radio receiver with which it is to be used.

2-3. POWER REQUIREMENTS.

The antenna tuning unit operates on 117V AC 60 cycle single phase current. A power cord is required, using Plug AN3102A-14S-9P to connect the tuning unit to the power supply.

2-4. INSTALLATION REQUIREMENTS.

a. INSTALLATION OF RADIO FREQUENCY TUNER HOUSING AND ANTENNA CONTROL UNIT.

(1) The radio frequency tuner housing, which supports the antenna is secured to a 12 x 12 inch steel plate. If the housing is mounted against a vertical surface, the steel plate should be welded in position with the access door facing outward. Gussets welded on either side of the plate will not interfere with maintenance. Two holes must be made in the tuner housing, one for the RG-12/U RF cable (not furnished), the other for the 8 conductor, shielded control cable (not furnished). Both cables must enter the tuner housing through stuffing tubes. The cables can enter the tuner housing wherever they will not prevent the removal of the R.F. Tuner.

(2) The end of the RG-12/U cable which enters the tuner housing should be terminated with a UHF male connector, type PL-259 (supplied). The cable is connected to the R.F. tuner by means of a UHF female connector, type SO-239, equipped with a length of shielded lead (supplied). The shielded lead will have to be cut to size and connected to E202 and the shield grounded at the ground lug located directly below E202.

(3) The receiver end of the RG-12/U cable is terminated with a type G.R. female connector (not supplied). If it is desired to use the AN/SRA-17A with a VLF/LF receiver other than the RBA, it may be necessary to use a different fitting.

(4) The AN/SRA-17A was designed to use 100 feet of RG-12/U cable between tuner and receiver. It is preferable to keep the cable less than 150 feet long. Satisfactory performance will be obtained with lengths up to 300 feet.

(5) One end of the 8 conductor cable which enters the R.F. tuner housing should be stripped ½ inch of its outer sheath. Strip each conductor back 3/16 inch and tin leads.

(6) Disassemble S201 as follows: Remove the spring support studs from the chassis with a 3/16 inch open end wrench; remove the two pan head screws securing the shell to the connector; lift shell from connector.

(7) Run cable thru cable clamp and shell.

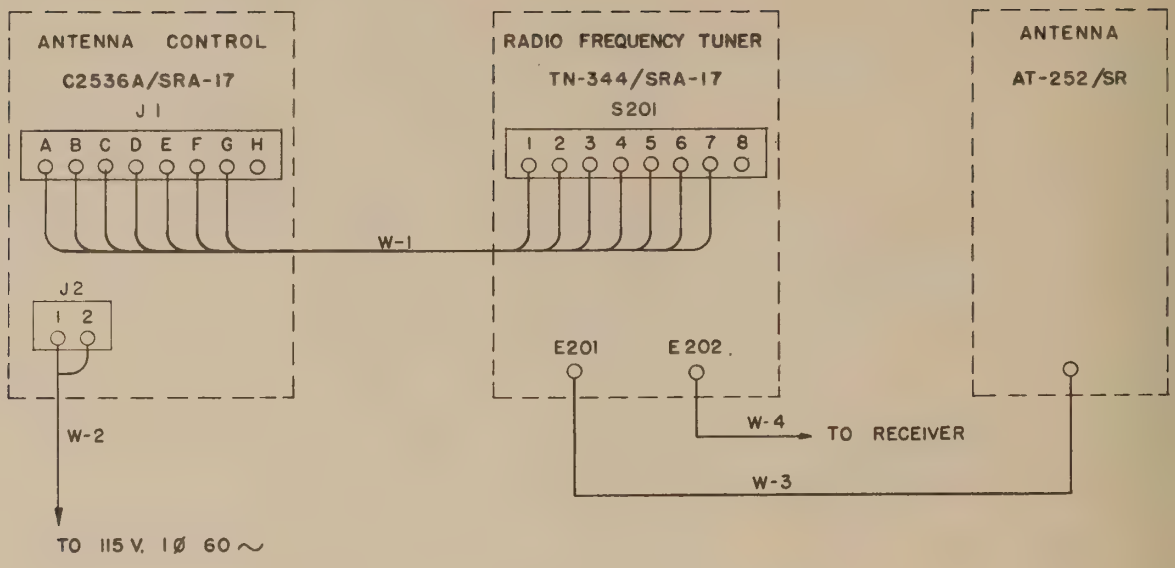
(8) Solder the 8-conductor cable to connector as shown in fig. 2-1.

(9) Reassemble connector making certain that the cable is facing the direction of the stuffing tube.

b. INSTALLATION OF ANTENNA AT-252/SR.—Antenna AT-252/SR is mounted on the tuner housing by six half-inch bolts welded to the steel plate. The tuner housing is shipped with the antenna insulator bolted on the plate. The insulator must be removed to attach the whip antenna to it. A 5 inch flexible antenna lead must be attached to the antenna before the insulator is again mounted on the R.F. tuner housing. The other end of the antenna lead should be connected to insulator E201 in the center of the R.F. tuner chassis.

2-5. PREPARATION FOR RESHIPMENT.

Remove Antenna AT-252/SR from the insulator, replace insulator onto R.F. tuner housing and tighten bolts securely. Protect insulator with corrugated cardboard or equivalent. Protect antenna from deformation due to rough handling. Mark the box containing technical manuals "TECHNICAL MANUALS INSIDE".



SYMBOL	NAVY TYPE	NO. ACT. COND.	COLOR	PAIR	FROM	JACK PLUG	PIN	TO	JACK PLUG	PIN	FUNCTION	COND. AMP.	SUPPLIED BY
W-1	TTRSA-4	7	WT.	1	ANT. CONTROL	J1	A	RF. TUNER	S201	1	GROUND		INST. ACTIVITY
			WT.	2		P1	B			2	INCREDUCTOR CONTROL CURRENT	.04 AMP	
			BLK.	2			C			3	RELAY CONTROL 80V.	8 MA	
			WT.	3			D			4	NOISE GENERATOR 105V.	—	
			BLK.	3			E			5	RELAY CONTROL 80V	8MA	
			WT.	4			F			6	RELAY CONTROL 80V.	8MA	
			BLK.	4			G			7	RELAY CONTROL 80V.	8MA	
W-2	DCOP-2	2	WT. BLK.			J2 P2	1 2	115 V. 1 Ø 60 ~	—	—	AC. POWER SUPPLY	—	INST. ACTIVITY
W-3	—	1	BLK.		E 201	—	-	ANT	—	—	SIGNAL COUPLING	—	CONTRACTOR
W-4	RG-12/U	COAX.	INNER SHIELD		E 202	J201 P201	CENTER SHELL	RECEIVER	SEE NOTE 1		SIGNAL COUPLING GROUND	—	INST. ACTIVITY

Figure 2-1. Antenna Group AN/SRA-17A Interconnecting Diagram.

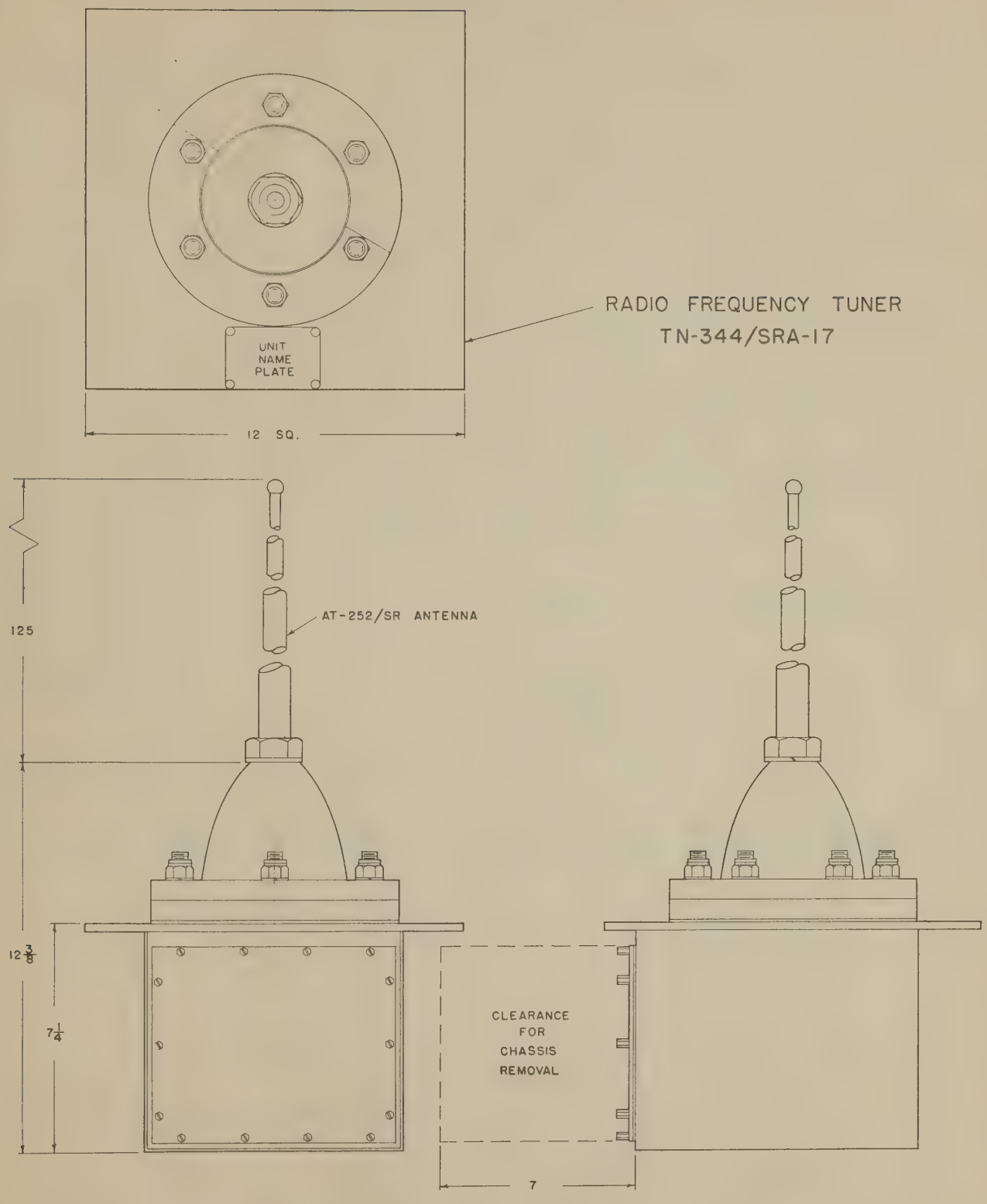
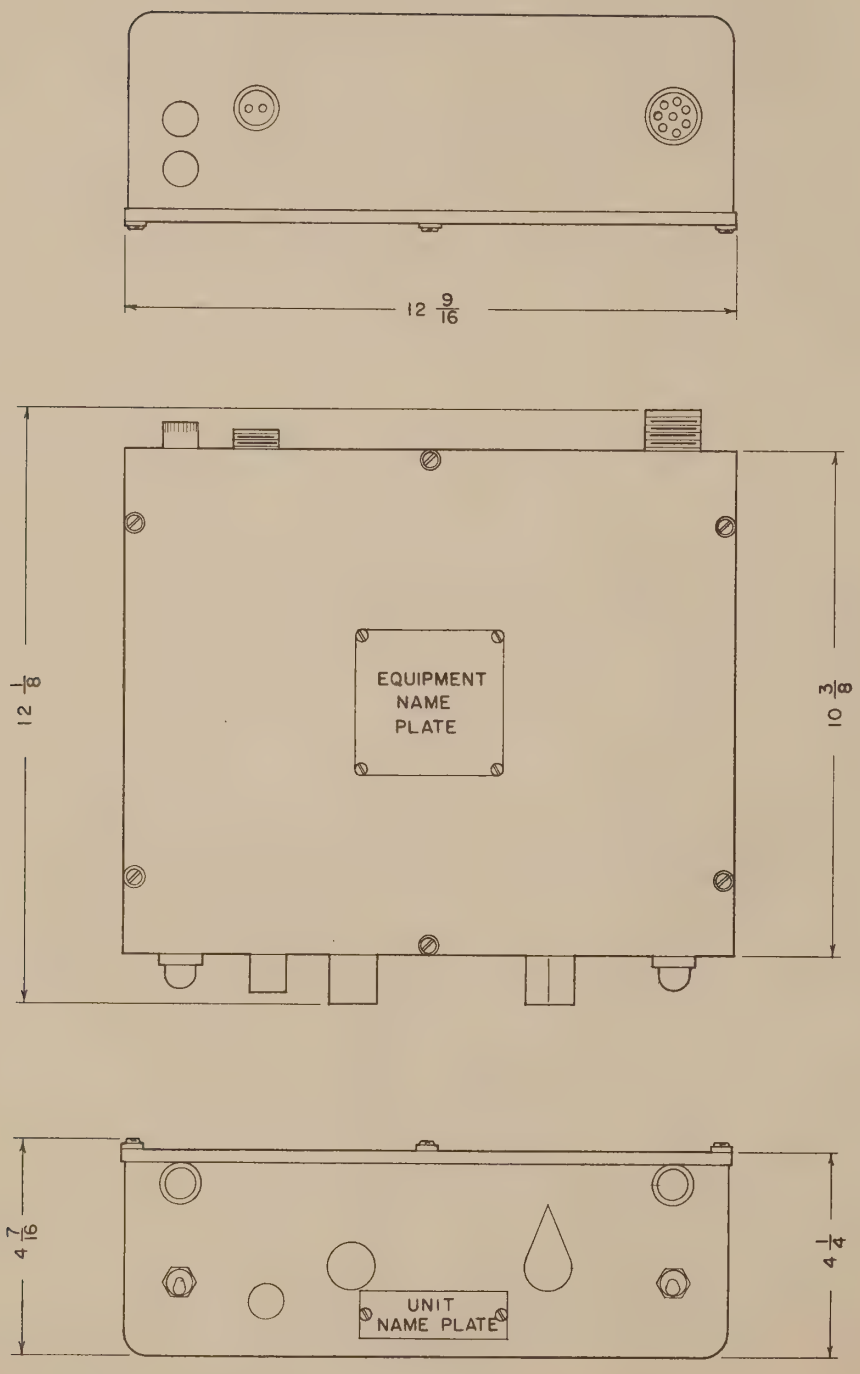


Figure 2-2. Radio Frequency Tuner TN-344/SRA-17 Outline Drawing.



ANTENNA CONTROL
C-2536A/SRA-17

Figure 2-3. Antenna Control C-2563A/SRA-17A Outline Drawing.

SECTION 3
OPERATOR'S SECTION

3-1. FUNCTIONAL OPERATION.

Operation of Antenna Group AN/SRA-17A is accomplished from the antenna control unit in conjunction with a receiver of appropriate frequency range (14kc-600kc).

3-2. OPERATING PROCEDURES.

a. Tuning in a signal on the receiver for maximum response consists of the following steps:

(1) Set the receiver to the desired frequency, with the gain control at maximum.

(2) Turn the range selector switch S3AB on the antenna control unit to the proper frequency range.

(3) Turn the noise generator on, and tune for the maximum noise using the tuning potentiometer R6AB on the antenna control unit. If the noise is greater than 20 db, back the receiver gain down. The tuning potentiometer should be used in conjunction with the receiver's antenna compensator. Peak one, then the other. If the antenna control is used with an RBA receiver, each coupling position should be tried with the tuning potentiometer and antenna compensator.

(4) After the optimum point has been determined, turn off the noise generator.

NOTE

If the noise generator is left in the ON position, the whip antenna is grounded, ALWAYS MAKE SURE THE NOISE GENERATOR IS OFF.

b. The desired signal on the receiver should now be peaked to within one db of maximum. It may be necessary, however, to produce the final peak signal by slightly rotating the tuning control to either side of its setting.

c. In addition to its use as a tuning indicator, the noise generator can be used as a rough measurement of receiver sensitivity as follows:

(1) Repeat steps 1, 2, and 3 described above.

(2) Turn the tuning potentiometer fully to the left to measure receiver noise output.

(3) Set the receiver gain to produce 0 db receiver noise. (0 reading on the SRR-11 or 0 on the DIRECT scale on the RBA).

(4) Repeak the tuning potentiometer to produce maximum noise and record the value. This value can be used to check the overall system performance from time to time. If this output falls off, there is indication of reduced performance. Typical values for both receiver and antenna group in good operating condition are as follows:

Frequency, KC	Output meter reading, ADD 20 DB scale
25	-3 db
62	-1 db
155	0 db
385	0 db

If the output falls more than 4 db below the values listed above, a check of receiver sensitivity is indicated. If the receiver is found not to have a sensitivity in accordance with its maintenance manual, try replacing CR201 in the R.F. tuner unit.

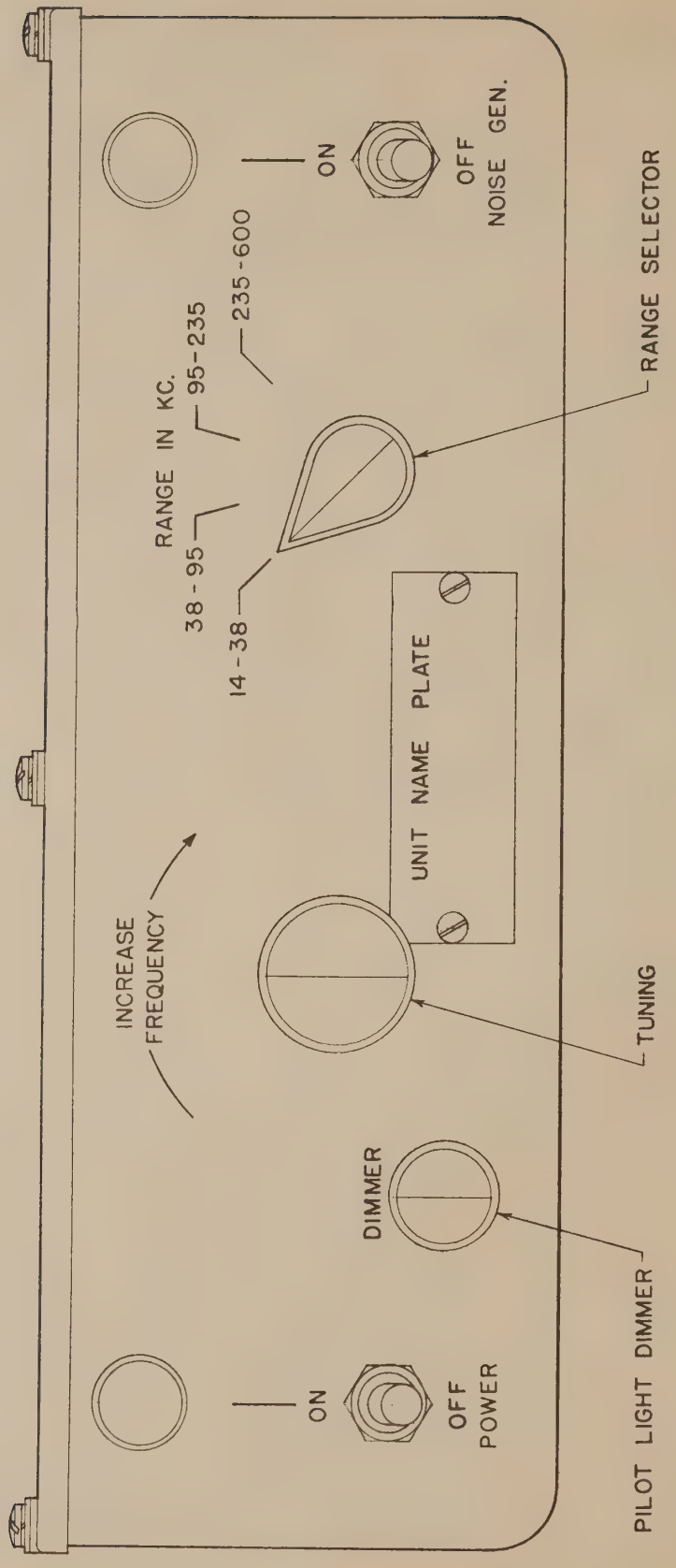


Figure 3-1. Antenna Control C-2536A/SRA-17. Front Panel Controls.

SECTION 4

PRINCIPLES OF OPERATION

4-1. OVERALL FUNCTIONAL DESCRIPTION.

Antenna Group AN/SRA-17A is divided for circuit discussion into (1) antenna control unit, (2) radio frequency tuner unit, and (3) noise generator circuit.

a. ANTENNA CONTROL UNIT.–The antenna control unit provides d.c. power to the radio frequency tuner through an 8-conductor shielded cable. A steady drain of approximately 10 milliamps is taken from the unregulated portion of the antenna control circuit for operation of relays K201, K202, and K203 in the R.F. Tuner. The relays, which have their coils in series, are actuated through the range selector Switch S3. To keep a constant 10 ma drain, a resistor having equivalent coil resistance is switched into the circuit when a relay is switched out.

The regulated output (105 volts) of the antenna control unit supplies current for the control windings of the variable inductors L201 and L202. The control winding current can be varied from 0 to 30 ma maximum by tuning potentiometer R6A-B. The tuning potentiometer is varied to resonate the inductor-antenna series circuit. Resistors R11, R12, and R13 in the increductor control winding circuit are used to give a bandspread effect for ease in tuning. A regulated voltage is also supplied for operation of the noise generator.

b. RADIO FREQUENCY TUNER.–The radio frequency tuner series tunes the antenna at its base through variable inductor L201 or L202.

The Increductor (variable inductor) consists of a signal winding and a control winding. These two windings are wound over a special ferro-magnetic core material. They are separated by an electrostatic shield to prevent capacitive coupling. Varying the d.c. current through the control winding changes the permeability of the core material and the inductance of the signal winding.

Increductor L201 has a starting inductance (with 0 control current) of 20 millihenries, L202 a starting inductance of 500 millihenries. Increasing the control current lowers this inductance. L202 is used in tuning the antenna from 14-95 kc in two ranges. L201 tunes from 95-600 kc, also in two ranges. Four shunt capacitors, C202 through C205, connected from the antenna side of the signal winding to ground, are used in conjunction with L201 and L202 to increase the starting control current. One is used for each frequency range. This increased current permits tuning at high ambient temperatures.

c. NOISE GENERATOR CIRCUIT.–CR201, a IN21B silicon diode, generates the r.f. noise supplied by the noise generator. Silicon diodes have the property of generating considerable r.f. noise when current is passed through them in the reverse direction, but this reverse current must be kept low in order to prevent damage to the crystal.

The noise generator circuit is mounted on terminal board TB202 in the R.F. tuner chassis. It consists of four components in addition to the diode: C206, C207, R201, and R202. Resistor R201 is the output impedance of the Noise Generator. Resistor R202 limits the current through CR201 to 1.0 milliampere. The generated noise is coupled to the increductor signal winding through the dummy antenna capacitor C206, substituted for antenna AT-252/SR when the noise generator is in operation. Capacitor C207 acts as a by-pass to isolate the noise generator from the power supply.

By means of the noise source it is possible to tune the actual antenna to a specific frequency quickly and accurately without the aid of a frequency calibrated dial on the antenna control unit. The noise source may also be used as a maintenance tool for rapidly checking the performance of the Antenna Group and associated receiver. See page 3-1.

SECTION 5
TROUBLE SHOOTING

5–1. SAFETY NOTICE.

NOTICE

The attention of the Officers and operating personnel is directed to Chapter 67 of the Bureau of Ships Manual or superseding instructions on the subject of radio safety precautions to be observed.

This equipment employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working at equipment maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe safety regulations. Do not change tubes or make adjustments inside the equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. Always remove power and discharge circuits to ground.

5–2. GENERAL.

a. ANTENNA AT-252/SR.–No maintenance is required by the antenna except for periodic checks of the insulator. The insulator should be cleaned regularly to remove deposits of soot or salt film that might eventually form a path to ground.

b. ANTENNA CONTROL AND RADIO FREQUENCY TUNER.–Maintenance of the antenna control and radio frequency tuner is largely a matter of routine checking and component replacement.

5–3. OVERALL TROUBLE SHOOTING.

a. PRELIMINARY CHECK.–Turn on equipment. If equipment is completely inoperative check fuses and power source. For fuse and tube location see figure 6-2. Check all cables for proper mating.

b. TEST EQUIPMENT AND TOOLS.–No special tools are required to service this equipment. A Multimeter AN/PSM-4B will be required to measure voltages and resistances accurately.

5–4. FUNCTIONAL TROUBLE SHOOTING.

The following tables of resistance and voltage measurements will be helpful in determining which unit and component is malfunctioning. Any deviation of approximately 20 per cent or more from the values indicated will disclose a possible source of trouble.

TABLE 5-1. ANTENNA CONTROL RESISTANCE MEASUREMENTS

PIN	POSITION OF RANGE SELECTOR SWITCH S-S			
	14-38 kc	38-95 kc	95-235 kc	235-600 kc
Noise Generator switch in OFF position				
A	0	0	0	0
B	9100	6400	6000	4000
C	Open	10000	10000	Open
D	Open	Open	Open	Open
E	Open	Open	23000	14000
F	Open	24000	Open	10000
G	Open	Open	Open	Open
H	Open	Open	Open	Open
Noise Generator switch in ON position				
A	0	0	0	0
B	9100	6400	6000	4000
C	Open	Open	Open	Open
D	4500	4500	4500	4500
E	Open	Open	23000	14000
F	Open	23500	Open	Open
G	3400	Open	Open	Open
H	Open	Open	Open	Open
All Readings in Ohms				

Conditions: Tuning potentiometer turned fully clockwise. Equipment off. Readings taken from pins of power output receptacle, J1, to ground.

TABLE 5-2. RADIO FREQUENCY TUNER RESISTANCE MEASUREMENTS

PIN A TO	RESISTANCE IN OHMS
B	1550
C	Open
D	110 K to 150 K
E	Open
F	Open
G	10.3K
H	Open

These readings can be taken at the Antenna control end of the control cable, from pin A1 (ground pin) of plug P1 to each successive pin.

TABLE 5-3. ANTENNA CONTROL UNIT VOLTAGE MEASUREMENTS, 5Y3 AND C1B

VOLTAGES TO GROUND	
Pin 8 of 5Y3	345 VDC
Plus side of C1B	340 VDC

All voltage readings were taken with Multimeter AN/PSM-4B

TABLE 5-4. ANTENNA CONTROL UNIT, VOLTAGE MEASUREMENTS

PIN	POSITION OF RANGE SELECTOR SWITCH S-3			
	14-38 kc	38-95 kc	95-235 kc	235-600 kc
Noise Generator switch in OFF position				
A	0	0	0	0
B	82	82	82	82
C	0	0	0	0
D	0	0	0	0
E	0	0	340	340
F	0	340	0	0
G	0	0	0	0
H	0	0	0	0
Noise Generator switch in ON position				
A	0	0	0	0
B	82	82	82	82
C	0	0	0	0
D	108	108	108	108
E	0	0	340	340
F	0	340	0	0
G	335	0	0	0
H	0	0	0	0
All Readings in DC Volts				

The following conditions should be observed: All measurements should be taken with Multimeter AN/PSM-4B. Tuning potentiometer should be tuned fully clockwise. Readings should be taken from pins of power output receptacle, J1, to chassis ground.

TABLE 5-5. VOLTAGE MEASUREMENTS, ANTENNA CONTROL UNIT AND RADIO FREQUENCY TUNER CONNECTED

PIN	POSITION OF RANGE SELECTOR SWITCH S-3			
	14-38 kc	38-95 kc	95-235 kc	235-600 kc
Noise Generator switch OFF				
A	0	0	0	0
B	18	27	30	60
C	0	85	85	165
D	0	0	0	0
E	0	87	185	260
F	0	170	90	90
G	0	0	0	0
H	0	0	0	0
Noise Generator ON				
A	0	0	0	0
B	18	27	30	60
C	0	85	85	165
D	105	105	105	105
E	0	87	185	260
F	0	170	90	90
G	85	85	85	85
H	0	0	0	0
All Readings in DC Volts				

Readings were taken with the tuning control potentiometer turned fully clockwise. For these measurements, remove the cover of the Antenna Control Unit. Readings should be taken from the back of receptacle J1 to ground, using Multimeter AN/PSM-4B.

TABLE 5-6. TYPICAL TROUBLES

TROUBLE	NATURE OF TROUBLE	SYMPTOMS
Inoperative	Blown fuse	Pilot light DS1 or DS2 and tubes not lighted.
Inoperative	Defective V1	No voltage or low voltage on pin 8 of V1.
Inoperative	Wrong connections made on R.F. Tuner S201 or capacitor C1A or C1B, shorted.	No voltage on pin 8 of V1 Plates of V1 overheated.
Tuning potentiometer inoperative	C-3 shorted R-5 open	Tuning potentiometer fails to vary gain indicator on receiver.
Noise generator inoperative	a. 1N21B crystal diode defective. b. Relay K203 inoperative. c. The signal winding of selected increductor open.	Noise generator fails to introduce noise into receiver.

SECTION 6
REPAIR

6-1. FAILURE REPORT

FAILURE REPORT

"Report each failure of the equipment, whether caused by a defective part, wear, improper operation, or an external cause. Use ELECTRONIC FAILURE REPORT form DD787. Each pad of the forms includes full instructions for filling out the forms and forwarding them to the Bureau of Ships. However, the importance of providing complete information cannot be emphasized too much. Be sure that you include the model designation and serial number of the equipment (from the equipment identification plate), the type number and serial number of the major unit (from the major unit identification plate), and the type number and reference designation of the particular defective part (from the technical manual). Describe the cause of the failure completely, continuing on the back of the form if necessary. Do not substitute brevity for clarity. And remember-there are two sides to the failure report-

"YOUR SIDE"

"Every FAILURE REPORT is a boost for you:

1. It shows that you are doing your job.
2. It helps make your job easier.
3. It insures available replacements.
4. It gives you a chance to pass your knowledge to every man on the team.

"BUREAU SIDE"

"The Bureau of Ships uses the information to:

1. Evaluate present equipment.
2. Improve future equipment.
3. Order replacements for stock.
4. Prepare field changes.
5. Publish maintenance data.

Always keep a supply of failure report forms on board. You can get them from the nearest Forms and Publications Supply Distribution Point."

6-2. REMOVAL OF PARTS AND SUB ASSEMBLIES.

a. REMOVAL OF RADIO FREQUENCY TUNER.–The removal of radio frequency tuner is accomplished by loosening the 14 nuts on R.F. tuner housing cover, (fig. 6-1) and remove the cover. Remove the four 8-32 nuts securing tuner in the housing, remove all leads secured on E201 and E202. Unscrew the two studs sesecuring the "Breakaway Connector" S201. Remove connector and pull chassis forward.

b. REPAIR OF ANTENNA CONTROL UNIT.–Loosen all screws securing cover of unit. (fig. 6-2)

c. REMOVAL OF ELECTRON TUBES.–Electron tubes V1 and V2 are secured by means of tube clamps; open clamps before attempting to remove tubes. Remove tubes by pulling away from chassis with a slight rocking motion.

d. REMOVAL OF CRYSTAL UNIT. Crystal unit IN21B is removed by pushing crystal towards the small end of crystal and lifting opposite end out. When replacing crystal make certain that the spring is in its socket.

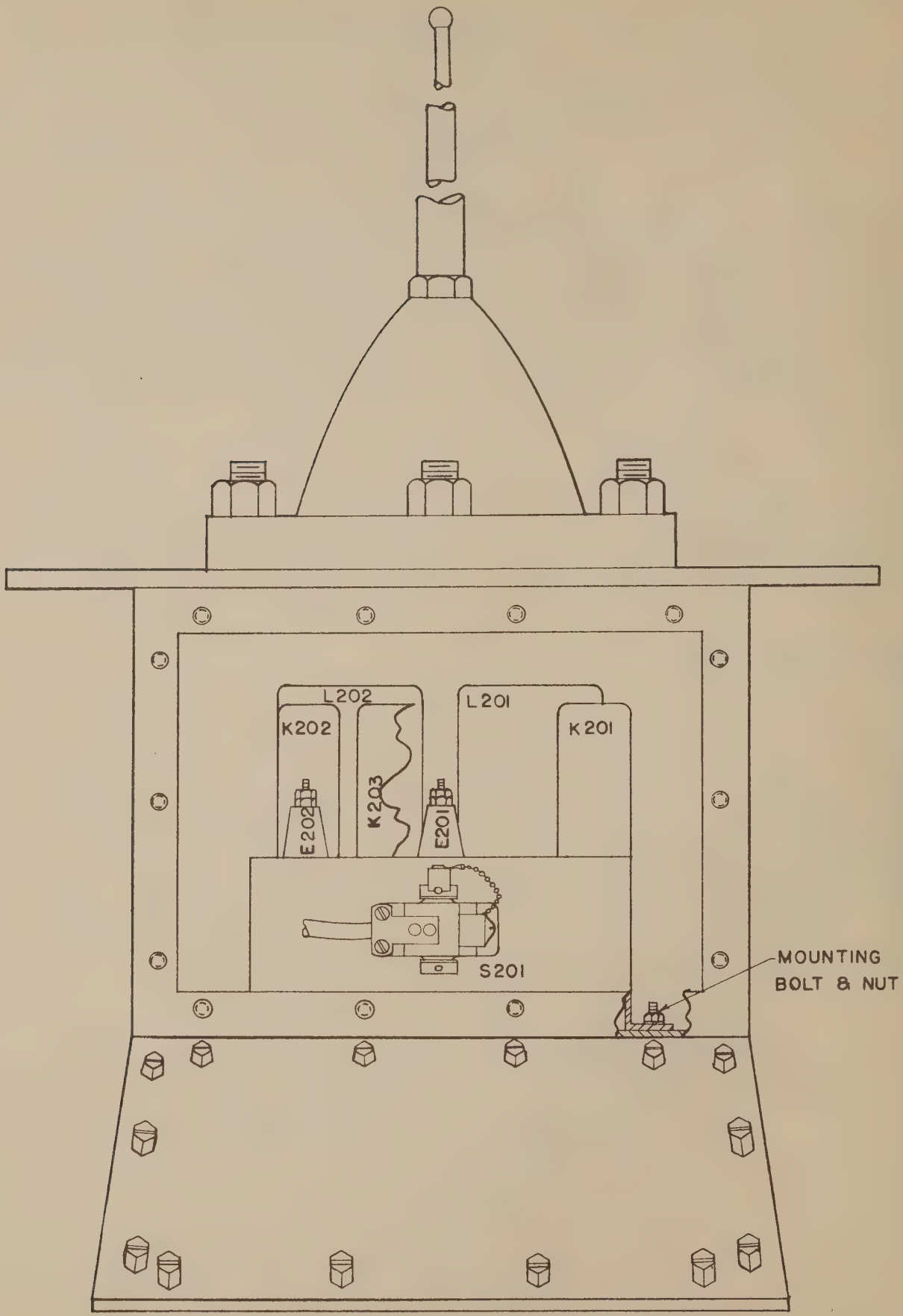


Figure 6-1. Radio Frequency Tuner and Housing TN-344/SRA-17.

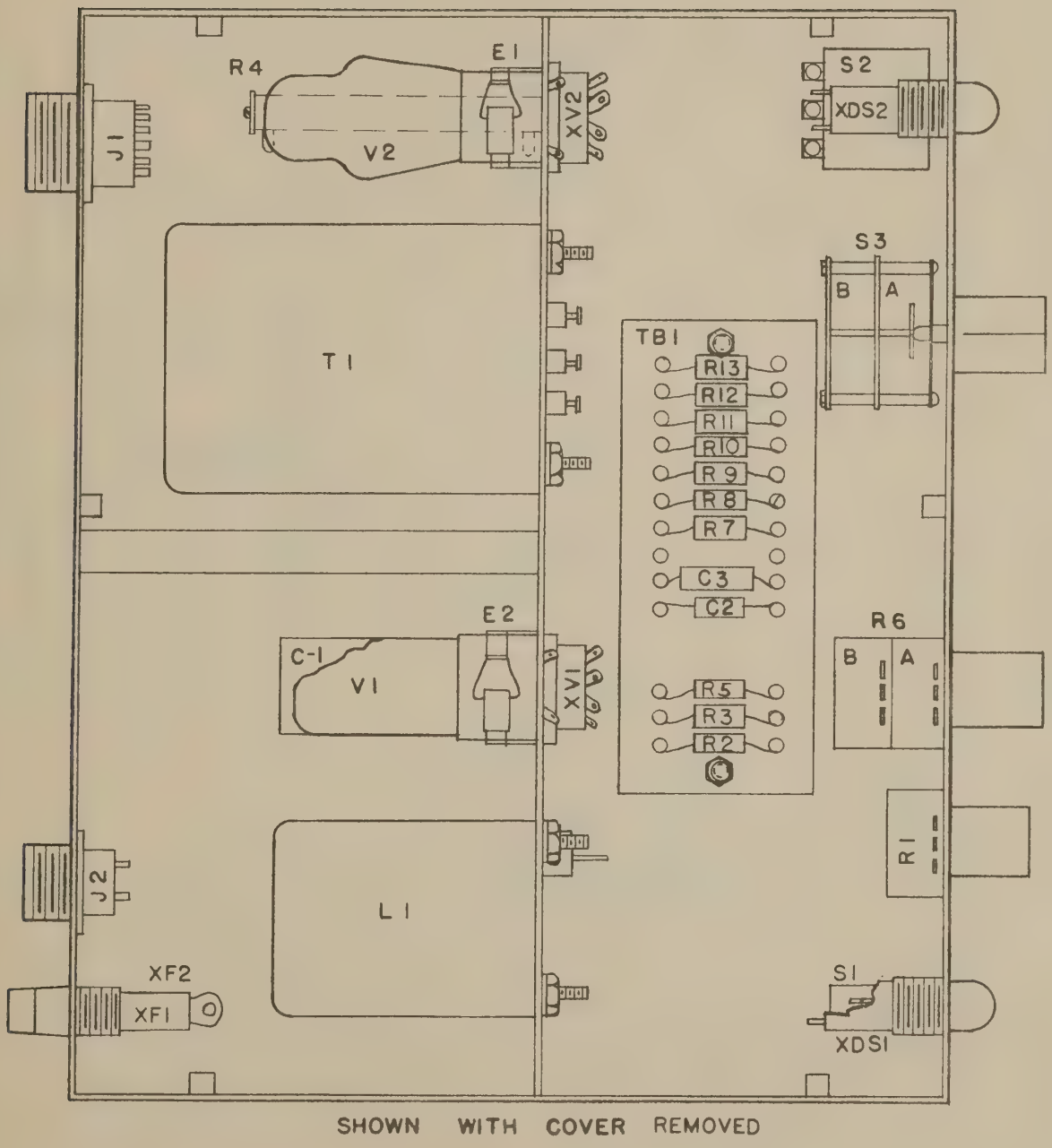


Figure 6-2. Antenna Control Unit C-2536A/SRA-17.

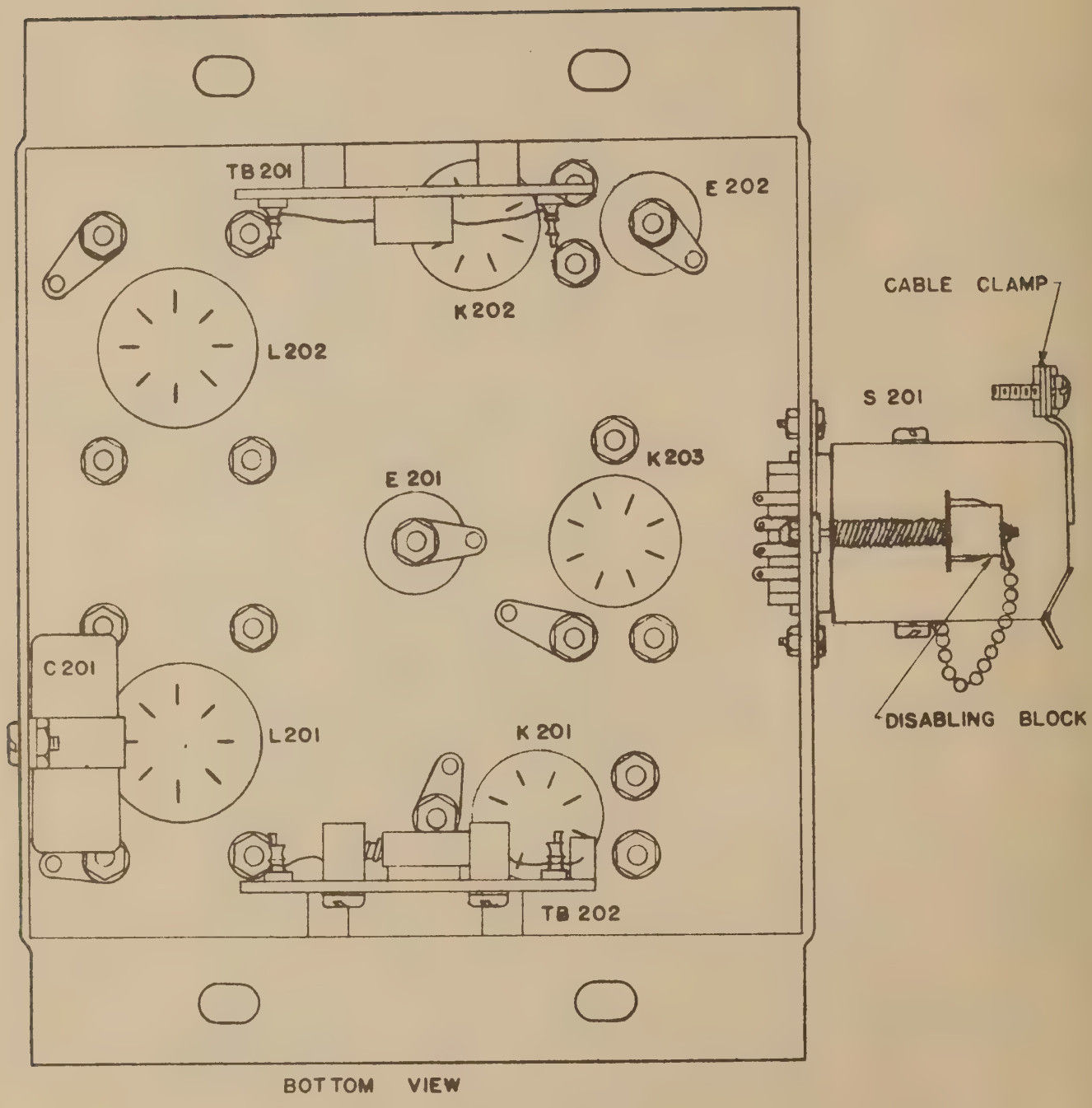


Figure 6-3. Radio Frequency Tuner, a unit of TN-344/SRA-17A.

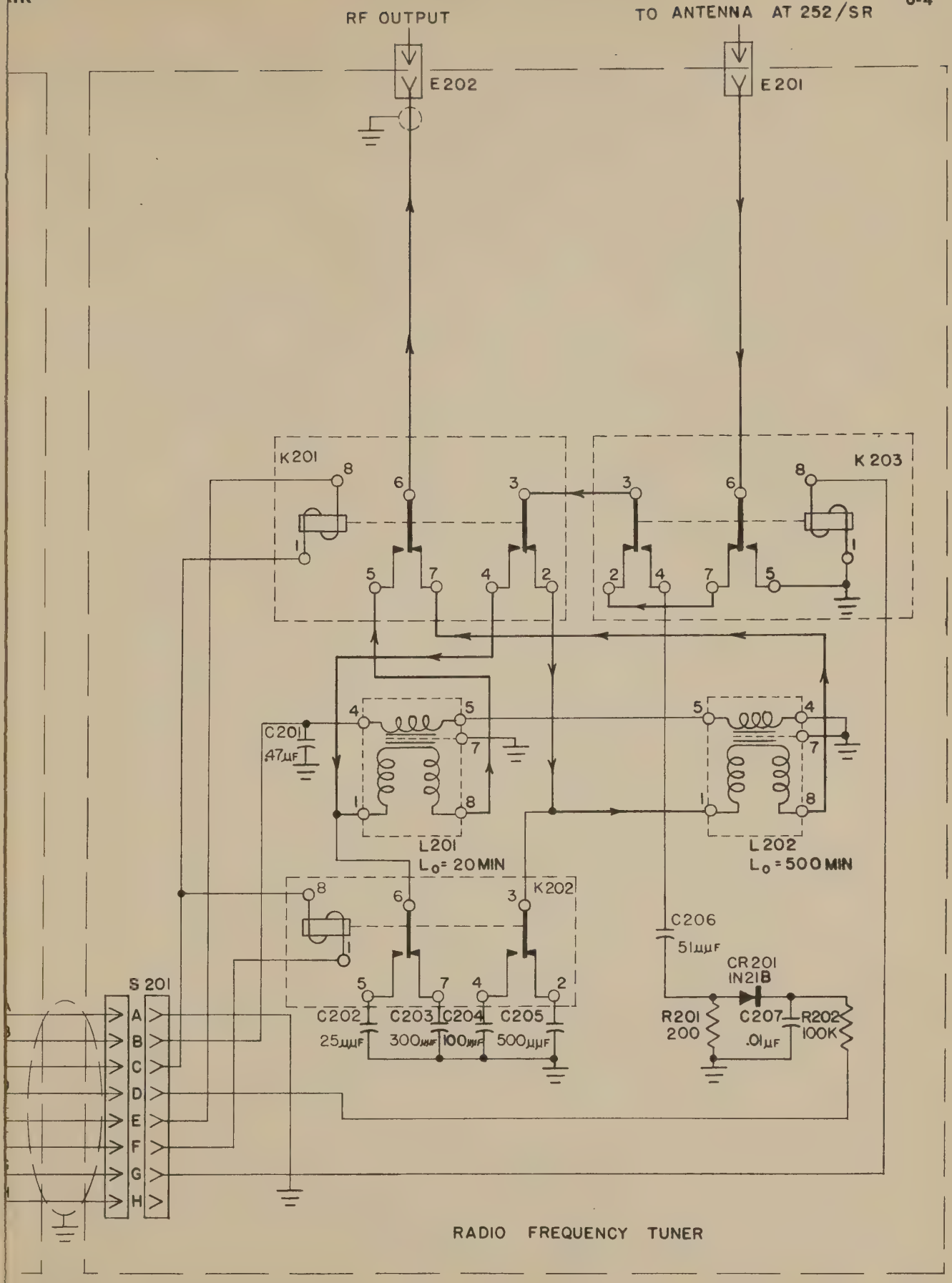


Figure 6-4. Antenna Group AN/SRA-17A Schematic Diagram.

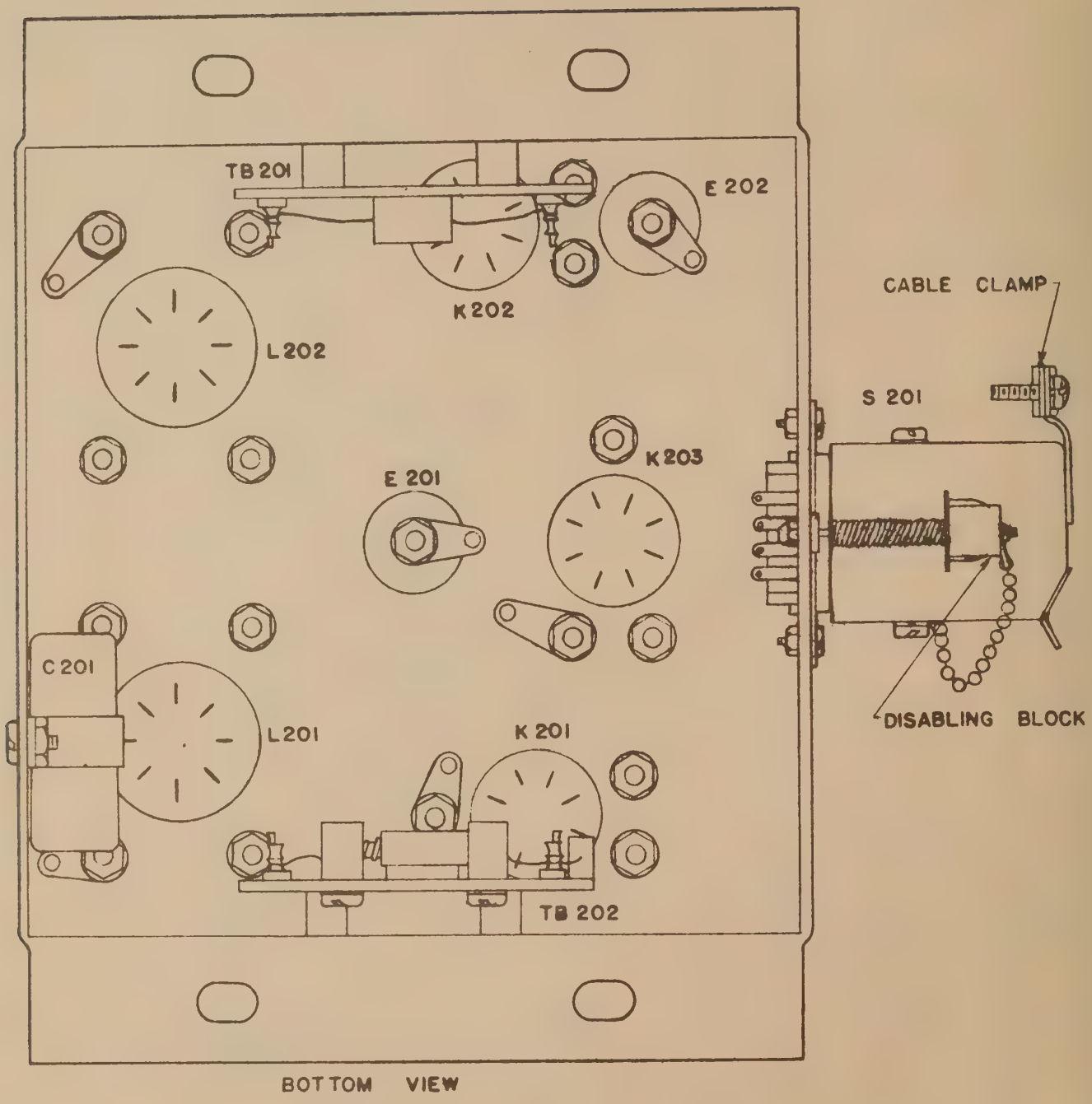
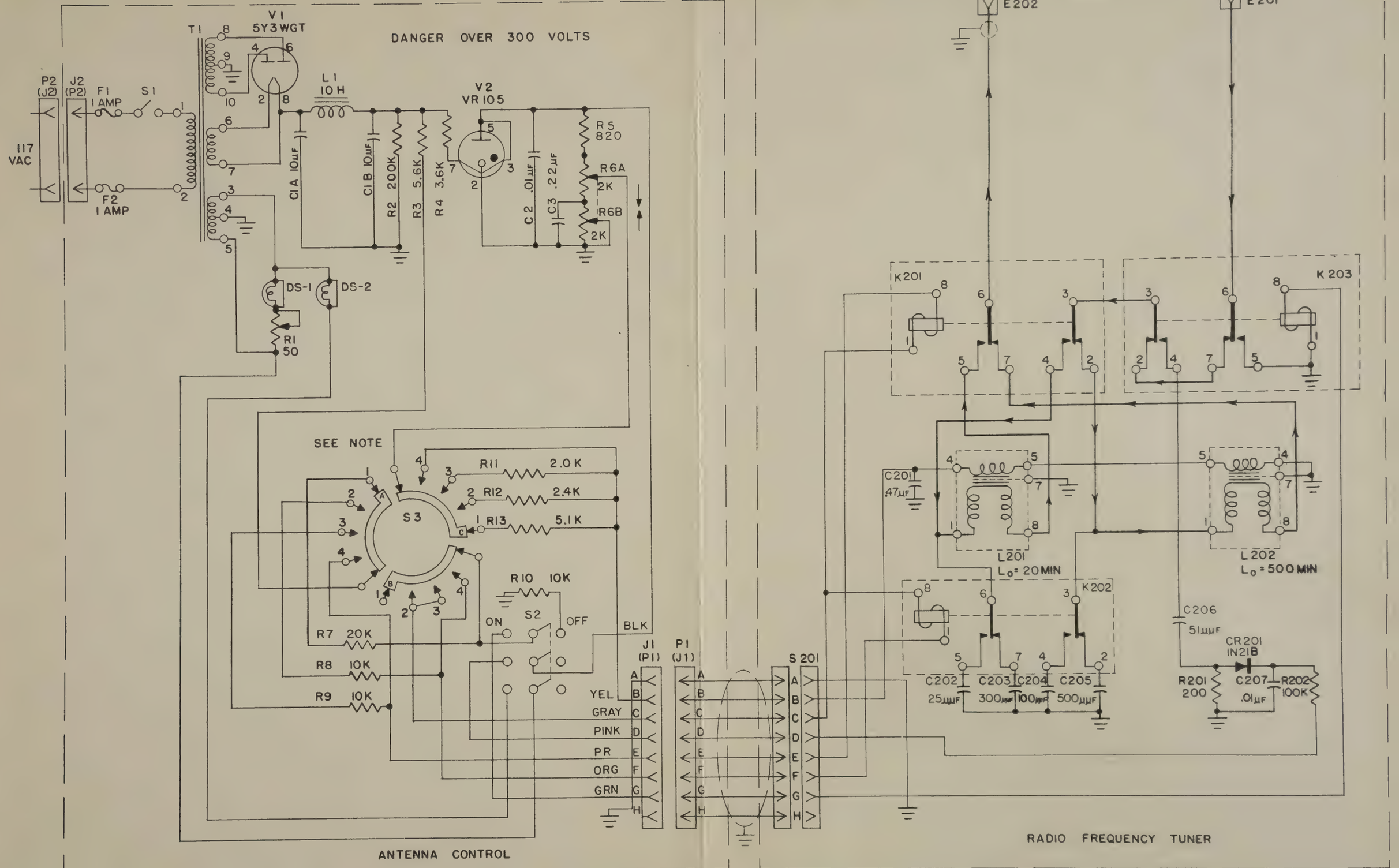


Figure 6-3. Radio Frequency Tuner, a unit of TN-344/SRA-17A.



NOTE :

POSITION 1 14-38KC RANGE
POSITION 2 38-95KC RANGE
POSITION 3 95-235KC RANGE
POSITION 4 235-600KC RANGE

Figure 6-4. Antenna Group AN/SRA-17A Schematic Diagram.

SECTION 7
PARTS LIST

7-1. INTRODUCTION.

Reference designations have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment and are included on drawings, diagrams and the part list. The letters of a reference designation indicate the kind of part, such as resistor, amplifier, electron tubes, etc. The number differentiates between parts of the same genetic group. Parts of the same first major units are numbered from 1 to 199; parts of the second 201 to 299, etc. Sockets associated with a particular plug in device, such as an electron tube or fuse, are identified by a reference designation of the plug in device. For example, the socket for fuse F-7 is designated XF7.

7-2. LIST OF MAJOR UNITS.

Table 7-1 is arranged by groups of reference designations that apply to a major unit.

7-3. MAINTENANCE PARTS LIST.

Table 7-2 lists all major units and their maintenance parts. The parts of each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the various parts in alphabetical and numerical order. Column 2 refers to the explanatory notes that appear in 7-5 below. Column 3 gives the name and describes the various parts. Complete information is given for all key parts (parts differing from any part previously listed in this table) and sub-key parts (parts identical with a key part but appearing for the first time for a major unit). The name and description are omitted for other parts. However, reference is made to the key part or sub-key part for the data. Column 4 indicates how the part is used and gives its functional location in the equipment.

7-4. STOCK NUMBERS.

Stock numbers of parts used in this equipment can be obtained by referring to the Stock Number Identification Table (SNIT) published by E.S.O.

7-5. NOTES.

The following provide additional information about items listed in table 7-2.

1. If exact replacement is not available replace with resistor made up of the following:

   a. RESISTOR. 1850 ohm 20 watt ww
      N.S. FL213-16-R-21300-64

   b. RESISTOR. 1750 ohm 20 watt ww
      N.S. FL213-16-R-21300-61

7-6. LIST OF MANUFACTURERS.

Table 7-3 lists manufacturers of parts used in the equipment. The first column includes the abbreviations used in table 7-2 to identify manufacturers.

TABLE 7-1. ANTENNA GROUP AN/SRA-17A, LIST OF MAJOR UNITS

REF. DESIG.	QUANTITY	NAME OF MAJOR UNIT	DESIGNATION	COLLOQUIAL NAME	PAGE
1 - 99 201 - 300	1 1 1	Antenna Control Radio Frequency Tuner Antenna	C-2536A/SRA-17 TN-344/SRA-17 AT-252/SR		

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

ANTENNA CONTROL C-2536A/SRA-17

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C1A, B		CAPACITOR, FIXED, ELECTROLYTIC: 450 vdc, each section; two 10 uf sections; metal case; uninsulated; 1-3/8 in. dia, 2-1/4 in. lg; 7/8-16 thd, 1/2 in. lg threaded mounting section. MIL-C-62 type no. CE42F100R.	Power Supply Filter

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C2		CAPACITOR, FIXED, PAPER DIELECTRIC: 600 vdc; .01 uf ± 10%; metal case; plastic insulated; hermetically sealed; .375 in. dia, 15/16 in. lg. MIL-C-25 type no. CPO9A1KF103K.	R.F. By-pass
C3		CAPACITOR, FIXED, PAPER DIELECTRIC: 200 vdc; .22 uf ± 10%; metal case; plastic insulated; hermetically sealed; .463 in. dia, 1-7/16 in. lg. MIL-C-25 type no. CPO5A1KC224K.	R.F. By-pass
DS1		LAMP, INCANDESCENT: 6-8 v; T-3-1/4; min. bayonet; SC; clear. MS 155710 (Ships). General Electric type no. 47.	Power Indicator
DS2		Same as DS1	Power Indicator
F1		FUSE, CARTRIDGE: 1 amp; 1-1/4 in. lg, 1/4 in. dia. MIL-F-16160 type no. MS 90079-20-1.	AC Line Fuse
F2		Same as F1	AC Line Fuse
H1		SCREW, EXTERNALLY RELIEVED BODY: brass; zinc plated; 8-32 thd, .586 in. lg, .397 in. lg; undercut head; flat black enamel. Lieco part no. 344NAG013.	Retains Cover Panel
H2		NUT, PLAIN, KNURLED: brass; zinc plated; .250 in. OD, 8-32 thd, .046 in. thk. Lieco part no. 344NAG014.	Retains H1
H3		WASHER, NON-METALLIC: Syn. rubber per MIL-R-900; 7/16 in. OD, 1/8 in. ID, 1/32 in. thk.	Seal for H1
J1		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric. MIL-C-5015 type no. AN3102A-18-8S; general purpose.	Power output connector
J2		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric. MIL-C-5015 type no. AN3102A-14S-9P; general purpose.	AC input connector
L1		REACTOR: One coil; 10H inductance; 85 madc; 175 ohms DC resistance. MIL-T-27 type no. TF1A04YY; Chicago Transformer Co. no. RH1085.	B+ Filter choke
MP1		RETAINER, ELECTRON TUBE: small shell octal, RETMA tube base retained. MIL-STD-242 type no. 804.5-1R; general purpose.	Retains V2
MP2		RETAINER, ELECTRON TUBE: intermediate shell octal, RETMA tube base retained. MIL-STD-242 type no. 804.5-3R; general purpose.	Retains V1
MP3		STRAP, RETAINING: brass; zinc plated; 12 gage, 1/2 in. w, 3.825 in. h, 3.3 in. gap. Lieco part no. 344NAG016.	Retains T1
MP4		MOUNT, RESILIENT: syn. rubber per MIL-R-900; 3 in. w, 4 in. lg, 1/4 in. thk. Lieco part no. 344NAG015.	Vibration isolator for T1
MP5		GASKET: syn. rubber per MIL-R-900; 1-3/8 in. sq., 1/16 in. thk; 1/8 in. dia holes in corners; one hole 7/8 in. dia in center. Bendix part no. 10-40450-18.	Chassis seal for J1
MP6		GASKET: syn. rubber per MIL-R-900; 1-1/8 in. sq., 1/16 in. thk; 1/8 in. dia holes in corners; one hole 3/4 in. dia in center. Bendix part no. 10-40450-14.	Chassis seal for J2

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
MP7		SEAL, PLAIN ENCASED: syn. rubber, molded to 3/16 in. hex nut; 3/8-32 thread; 1/4 in. shaft clearance. MIL-B-19257 type C size 2; APM no. N-9030-1/4.	Chassis and shaft seal for R1.
MP8		Same as MP7	Chassis and shaft seal for R6AB
MP9		Same as MP7	Chassis and shaft seal for S3AB
MP10		BOOT, DUST AND MOISTURE SEAL: synthetic rubber flexible component. MIL-B-19257 type A style 1; APM no. N-1030	Seal for S1
MP11		Same as MP10	Seal for S2
P1		CONNECTOR, PLUG ELECTRICAL: 8 contacts; single mating end. MIL-C-5015 type no. AN3106A-18-8P.	Power output
P2		CONNECTOR, PLUG, ELECTRICAL: 2 contacts; single mating end. MIL-C-5015 type no. AN3106A-14S-9S.	AC input connector
R1		RESISTOR, VARIABLE: composition element; 1 section; 50 ohms ± 10%; 2 watts nom. power rating; std. A taper; single shaft; metal; round slotted, .063 in. lg, .047 in. w; 1/4 in. dia, 1/2 in. lg; normal torque. MIL-R.94 type no. RV4NAYSD500A.	Pilot light dimmer
R2		RESISTOR, FIXED, COMPOSITION: 200 K ohms ± 10%; 1 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC32GF204K.	Bleeder for power supply
R3		RESISTOR, FIXED, COMPOSITION: 5.6 ohms, ± 10%; 2 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC42GF562K.	Voltage drop for relay circuit
R4	1	RESISTOR, FIXED, WIREWOUND: inductive winding 3600 ohms total resistance ± 10% tolerance; 26 w power dissipation. MIL-R-26 type no. 33V362; Ward Leonard style no. 33V362.	Voltage drop
R5		RESISTOR, FIXED, COMPOSITION: 820 ohms, ± 10%; 2 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC42GF821K.	Voltage drop
R6A, B		RESISTOR, VARIABLE: wire wound element; 2 section; 2000 ohms ± 10% each section; 3 watts nom. power rating; std. A taper; single shaft; metal; round slotted, .063 in. lg, .047 in. w; 1/4 in. dia, 1/2 in. lg; normal torque. MIL-R-19 type no. RA30NASA202A; Clarostat series D58M.	Increductor current control
R7		RESISTOR FIXED, COMPOSITION: 20K ohms, ± 10%; 2 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC42GF203K.	Dummy Load for relays
R8		RESISTOR, FIXED, COMPOSITION: 10K ohms, ± 10%; 2 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC42GF103K.	Dummy Load for relays
R9		Same as R8	Same as R8
R10		Same as R8	Same as R8

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R11		RESISTOR, FIXED, COMPOSITION: 2000 ohms, ± 10%; 1 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC32GF202K.	Current limiting
R12		RESISTOR, FIXED, COMPOSITION: 2400 ohms, ± 10%; 1 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC32GF242K.	Current limiting
R13		RESISTOR, FIXED, COMPOSITION: 5100 ohms, ± 10%; 1 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC32GF512K.	Current limiting
S1		SWITCH, TOGGLE: spst; MS-35058-9.	On-off power
S2		SWITCH, TOGGLE: tpdt; MS-25068-23.	On-off noise generator
S3A, B		SWITCH, ROTARY: sectional type; two sections; MIL-S-3786. Centralab part no. CRL-PA2514M.	Frequency range selector
T1		TRANSFORMER, POWER, STEP-DOWN AND STEP UP: 115 volts; 60 cycles; single phase; 5 volts, 2 amps; 6.3 volts centertapped, 3 amps; 640 volts, centertapped, 85 ma. MIL-T-27 type no. TF1A03YY.	Power transformer
TB1		TERMINAL BOARD: terminals incl, 26; solder stud type. Lieco part no. 344NAG006.	Component mounting
V1		ELECTRON TUBE: MIL-E-1 type no. 5Y3WGT.	Rectifier
V2		ELECTRON TUBE: MIL-E-1 type no. OC3.	Voltage regulator
XDS1		LIGHT, INDICATOR: suppl. with lens; .650 in. dia lens; plastic; red; MIL-L-3661. Dialight Corp. no. 26410W-1135.	Power on indicator
XDS2		LIGHT, INDICATOR: suppl. with lens; .650 in. dia lens; plastic white; MIL-L-3661. Dialight Corp. no. 26410W-1111.	Noise generator on indicator
XF1		FUSEHOLDER: extractor post type; MIL-STD-242 type no. FD1.	Hold F1
XF2		Same as XF1	Hold F2
XF3		FUSEHOLDER: block type. Littlefuse type no. 357002.	Spare fuse holder.
XV1		SOCKET, ELECTRON TUBE: copper base alloy contacts; nonprecious metal plated. MIL-S-12883/1 type no. TS101PO2.	Holds V1
XV2		Same as XV1	Holds V2

RADIO FREQUENCY TUNER TN-344/SRA-17

C201		CAPACITOR, FIXED, PAPER DIELECTRIC: 200 vdc; .47 uf ± 10%; metal case; plastic insulated; hermetically sealed; .625 in. dia, 1 7/16 in. lg. MIL-C-25 type no. CP05A1KC474K	RF by-pass
C202		CAPACITOR, FIXED, MICA DIELECTRIC: 300 vdc; 24 uuf	Shunt for increasing

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
		± 5%; low loss plastic case; hermetically sealed; 33/64 in. lg, 19/64 in. w, 3/16 in. thk. MIL-C-5 type no. CM15B240J.	starting control current for the 235-600 KC range
C203		CAPACITOR, FIXED, MICA DIELECTRIC: 300 vdc; 300 uuf ± 5%; low loss plastic case; hermetically sealed; 33/64 in. lg, 19/64 in. w, 3/16 in. thk. MIL-C-5 type no. CM15B301J.	Same as C202 for 95-235 KC range
C204		CAPACITOR, FIXED, MICA DIELECTRIC: 300 vdc; 100 uuf ± 5%; low loss plastic case; hermetically sealed; 33/64 in. lg, 19/64 in. w, 3/16 in. thk. MIL-C-5 type no. CM15B101J.	Same as C202 for 38-95KC range
C205		CAPACITOR, FIXED, MICA DIELECTRIC: 300 vdc; 510 uuf ± 5%; low loss plastic case; hermetically sealed; 33/64 in. lg, 19/64 in. w, 3/16 in. thk. MIL-C-5 type no. CM15B511J.	Same as C202 for 14-38 KC range
C206		CAPACITOR, FIXED, MICA DIELECTRIC: 300 vdc; 51 uuf ± 5%; low loss plastic case; hermetically sealed; 33/64 in. lg, 19/64 in. w, 3/16 in. thk. MIL-C-5 type no. CM15B510J.	Dummy antenna for use with noise generator
C207		CAPACITOR, FIXED, PAPER DIELECTRIC: 400 vdc; .01 uf ± 20%; metal case, plastic insulated; hermetically sealed; .235 in. dia, 3/4 in. lg. MIL-C-25 type no. C099A1EE103M.	Noise generator by-pass
CR201		SEMICONDUCTOR DEVICE, DIODE: MIL-E-1 type no. IN21B.	Noise generator
E201		INSULATOR, BUSHING: ceramic, glazed per JAN-1-10. Birnbach no. 458	Antenna input
E202		Same as E201	Tuner output
E203		Not used	
E204		ANTENNA: 14 to 600 KC frequency range. Navy type no. AT-252/SR modified to add 1/2 in. SST ball silver soldered to tip.	Receiving antenna
E205		SHIELD, ELECTRICAL CONNECTOR RECEPTACLE: metallic; silver plated. MIL-C-71 type no. UG-106/U.	Shield for J201
H201		NUT, PLAIN PLATE: stainless steel per QQ-S-763; 5/16 in. hex head, .660 in. lg; 1/4-32, .040 in. lg, external thread; 8-32, .250 in. lg. internal thread; .210 in. dia. 270 in. lg clearance undercut. Lieco part no. 344NAG011.	Retain RF Tuner Housing cover
J201		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric; type SO-239; Navy dwg. RE-B-49252. Amphenol part no. CPH-49194.	RF cable connector
K201		RELAY ARMATURE: dpdt; 80 vdc; 10K ohms dc coil resistance. CP Clare type no. RP6194G1.	Switch RF output of increductors L201 and L202
K202		Same as K201	Switch Shunt capacitors C202, C203, C204 and C205
K203		Same as K201	Switch antenna and noise generator
L201		SATURABLE REACTOR: inductance with zero control cur-	Base tune antenna,

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
		rent 20MH. CGS Lab Inc. part no. 58DB1.	95-600 KC range
L202		SATURABLE REACTOR: inductance with zero control current 500 MH. CGS Lab Inc. part no. 48DB2.	Base tune antenna 14-95 KC range
MP201		GASKET: syn. rubber per MIL-R-900; 6 1/4 in. w, 7 3/4 in. lg, 7/32 in. thk.; fourteen 17/64 in. dia slots around perifery. Lieco part no. 344NAG012.	Cover seal for RF Tuner Housing
P201		CONNECTOR, PLUG, ELECTRICAL: coax; single mating end; type PL259; Navy dwg. no. RE-B-49251. Amphenol part no. 83-1SP.	RF cable connector, plug for J201
R201		RESISTOR, FIXED, COMPOSITION: 200 ohms, ± 10%; 1/2 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC20GF201K.	Output of noise generator
R202		RESISTOR, FIXED COMPOSITION: 100K ohms, ± 10%; 1/2 watt power dissipation; 70°C ambient temp. MIL-R-11 type no. RC20GF104K.	Current limiting for CR201
S201		SWITCH, INTERLOCK: dc; 1 amp; 250 v max; 8 circuit single break; male and female type. Lieco part no. 344NAGB6.	Safety interlock
TB201		TERMINAL BOARD: terminals incl, 8; solder stud type. Lieco part no. 344NAG010.	Component mounting
TB202		Same as TB201	Same as TB201
XCR201		SOCKET, CRYSTAL: 2 contact positions; contacts regularly spaced. .800 in. apart; copper base alloy contacts, silver plated. Lieco part no. 344NAG017.	Holds CR201

TABLE 7-3. ANTENNA GROUP AN/SRA-17A, LIST OF MANUFACTURERS

ABBREVIATION	NAME	ADDRESS
Amphenol	American Phenolic Corp.	1830 So. 54th Ave., Chicago, Ill.
A.P.M.	Automatic Precision Manuf. Co.	252 Hawthorne Ave., Yonkers, New York
Bendix	Bendix Aviation Corp.	Teterboro, New York
Birnbach	Birnbach Radio Co., Inc.	145 Hudson St., New York, N. Y.
Centralab	Central Radio Lbaoratory	900 Keefe Ave., Milwaukee, Wisc.
CGS	CGS Laboratories Inc.	Ridgefield, Conn.
Chicago	Chicago Standard Transformer Corp.	3501 Addison St., Chicago, Ill.
Clarostat	Clarostat Mfg. Co., Inc.	Washington St., Dover, N. H.
C.P. Clare	C.P. Clare & Co.	3101 Pratt Blvd., Chicago, Ill.
Dialco	Dialight Corp. of America	900 Broadway, New York, N. Y.
G.E.	General Electric Co.	Nela Park, Cleveland, Ohio
Lieco	Lieco, Inc.	130 Eileen Way, Syosset, N. Y.
Littlefuse	Littlefuse, Inc.	1865 Miner St., Des Plaines, Ill.
Ward Leonard	Ward Leonard Electric Co.	75 South St., Mt. Vernon, N. Y.

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CHANGE 1 to Technical Manual for Antenna Group AN/SRA-17A
NAVSHIPS 93679

This permanent change revises the book to current omissions and reflect the equipment changes to the AT-252/SR antenna modified to AT-924A/SR.

Maintenance Support Activities shall insert this change in the technical manual immediately upon receipt. When this Change is included in the manual the manual shall cover the equipment as though equipment change has been accomplished on the equipment.

When inserted Change 1 supersedes original Manual. No Temporary corrections are in existence.

1. Remove superseded pages and insert revised pages as indicated below:

Page	Remove	Insert
T.P./ii	Orig/Orig	Ch 1/Ch 1
1-1/1-2	Orig/Orig	Ch 1/Ch 1
2-1/2-2	Orig/Orig	Ch 1/Ch 1
2-3/2-4	Orig/Orig	Ch 1/Orig
4-1/5-0	Orig/Orig	Ch 1/Ch 1
7-OA/Blank	- - -/- - -	Chg 1/Blank
7-1/7-2	Orig/Orig	Chg 1/Orig

2. Make the following pen and ink corrections and mark "ch. 1" adjacent to the pen and ink corrections.

First Issued In	Page No	Ch. In Effect	Col'm or Fig.	Line or Location	Action
Orig.	1-0	Orig.	1-1	Top	Change Antenna AT-252/SR to read AT-924A/SR
Orig.	7-6	Orig.	Table 7-3	Bottom	add the following "Linear" in col 1 "Linear Inc" in col 2 "State Rd, Phila. Pa" in col 3

3. Destroy superseded pages but not until the complete manual has been checked against the "List of Effective Pages"

4. Insert this Instruction Sheet just behind the front cover.

5. Make appropriate entry on correction page.

NAVSHIPS 93679 *(Non-Registered)*

TECHNICAL MANUAL

for

ANTENNA GROUP AN/SRA-17 A

LIECO INC.
130 EILEEN WAY
SYOSSET, N.Y.

DEPARTMENT OF THE NAVY

BUREAU OF SHIPS

Contract NObsr—75382

Approved by BuShips: 26 August, 1960
Change Number One: 16 February, 1961

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Change 1	3-1 to 3-2	Original
ii	Change 1	4-1	Change 1
iii to vii	Original	5-0	Change-1
1-0	Change 1	5-1 to 5-2	Original
1-1 to 1-2	Change 1	6-1 to 6-6	Original
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		7-2 to 7-5	Original
		7-6	Change 1
		i-1, i-2	Original

SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION.

This Technical Manual covers the theory, installation and maintenance of Antenna group AN/SRA-17A.

1-2. FUNCTIONAL DESCRIPTION.

Antenna Group AN/SRA-17A provides a physically small, but efficient receiving antenna covering the VLF-LF frequency range, for installations where interaction between large, closely spaced antennae would present a problem, and on smaller craft where space for a long wire antenna is not available.

b. GENERAL. Antenna Group AN/SRA-17A (fig. 1-1) consists of one 10½ foot vertical whip antenna, one radio frequency tuner, and one antenna control unit.

c. ANTENNA. The antenna consists of a 10½ foot stainless-steel tubular whip and its mounting. The assembly is a complete unit, Navy type AT-924A/SR. The antenna mounted on a 12-inch square steel plate which forms part of the radio frequency tuner housing. The antenna is connected to a Navy type RBA or AN/SRR-11 receiver by a 72 ohm cable (not furnished).

d. RADIO FREQUENCY TUNER TN-344/SRA-17. The radio frequency tuner consists of two variable inductors (Increductors) and a silicon diode noise source, plus associated relays for switching the proper inductors and noise source into the circuit. The noise source is used as a tuning aid, since the antenna control has no calibrated dial. The tuner is mounted on a small chassis which fits into the radio frequency tuner housing.

e. ANTENNA CONTROL C-2536A/SRA-17. The antenna control unit provides a regulated d.c. power supply for the operation of the relays and variable inductors in the radio frequency tuner unit. The antenna control unit is located at the receiver position, thus enabling the operator to tune the antenna from this remote location. Interconnection is made to the radio frequency tuner unit by a control cable (not furnished).

1-3. QUICK REFERENCE DATA.

a. Frequency range	14kc - 600kc
(1) Tuning Bands	band 1: 14kc - 38kc band 2: 38kc - 95kc band 3: 95kc - 235kc band 4: 235kc - 600 kc
b. Type of frequency adjustment.	Frequency is adjusted by varying the dc current thru the variable inductors by means of potentiometer R6.
c. Antenna impedance	72 ohms.
d. Sensitivity	20 db signal to noise ratio minimum sensitivity.
RBA	Band 1 - 15kc - 13.4 Microvolts. 25kc - 10.8 Microvolts. 38kc - 12.9 Microvolts.
	Band 2 - 38kc - 5.1 Microvolts. 65kc - 5.0 Microvolts. 95kc - 5.7 Microvolts.
	Band 3 - 95kc - 5.0 Microvolts. 165kc - 4.6 Microvolts. 235kc - 5.6 Microvolts.
	Band 4 - 235kc - 3.1 Microvolts. 420kc - 3.0 Microvolts. 600kc - 4.2 Microvolts.

TABLE 1-1. EQUIPMENT SUPPLIED

QUANTITY PER EQUIPMENT	NOMENCLATURE		OVERALL DIMENSIONS*				
	Name	Designation	Height	Width	Depth	Volume*	Weight*
1	Antenna Control	C-2536A/SRA-17	4½	12½	12	.892	14
1	Radio Frequency Tuner and housing	TN-344/SRA-17	10½	12	12	.904	22
1	Antenna	AT-924A/SR	131	7 dia.	at widest point		20
1	Connector	AN3106A-14S-9S					
1	Connector	AN3106A-18-8P					
1	UHF Connector	PL-259,49190					
1	UHF Connector	SO-239,49194					
1	UHF Shield	UG-106/U,M-360					
2	Technical Manual	NAVSHIPS 93679					

*Unless otherwise stated, dimensions are in inches, volume in cubic feet, weight in pounds.

e. Operating characteristic of power supply 117 Volts AC 60 cps single phase.

1-4. EQUIPMENT LISTS.

A list of equipment supplied is contained in Table 1-1. Table 1-2 lists equipment required but not supplied. Shipping data on equipment and publications supplied is given in Table 1-3. Electron tube complement is contained in Table 1-4.

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QUANTITY PER EQUIPMENT	NOMENCLATURE		REQUIRED USE	REQUIRED CHARACTERISTICS
	Name	Designation		
1	Coaxial Cable	RG-12U	Connect radio frequency tuner to receiver	Length as required at installation
1	Power Cable	DCOP-2	Connect antenna control to power supply	Length as required at installation
1	G.R. type* female connector	NT49121-A	Fitting for RG 12/U cable	
1	Control Cable	TTRSA-4	Connect output of antenna control to radio frequency tuner input	8-conductor shielded cable length as required at installation

*For RBA receivers, Type N for AN/SRR-11

TABLE 1-3. SHIPPING DATA

BOX NUMBER	NOMENCLATURE		OVERALL DIMENSIONS				
	Name	Designation	Height	Width	Depth	Volume*	Weight*
1	Antenna Control Radio Frequency tuner	C-2536/SRA-17 TN-344/SRA-17A	24½	15	15	3.12	100
2	Whip Antenna	AT-924A/SR	6	6	10½ ft.	.219	35

*Unless otherwise noted, dimensions are in inches, volume in cubic feet, and weight in pounds; equipment crated and ready for shipment.

TABLE 1-4. ELECTRON TUBE COMPLEMENT

UNIT	NUMBER OF TUBES OF TYPES INDICATED	
	5Y3 WGTA	VR 105
Antenna Control	1	1

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

Antenna AT-924A/SR is secured in its crate by small wood blocks. All nails securing these blocks must be removed before attempting to lift the antenna from the crate.

2-2. SITE SELECTION.

Antenna Group AN/SRA-17A is designed for shipboard installation. For optimum performance Antenna AT-924A/SR and the radio frequency tuner should be mounted in a clear space near the top of a mast, king post, stack or other vertical portion of the superstructure. Vertical mounting of the antenna is necessary as insulator bowl may be strained when the antenna is mounted in a horizontal position. The antenna control unit is installed in the radio room directly above the radio receiver with which it is to be used.

2-3. POWER REQUIREMENTS.

The antenna tuning unit operates on 117V AC 60 cycle single phase current. A power cord is required, using Plug AN3102A-14S-9P to connect the tuning unit to the power supply.

2-4. INSTALLATION REQUIREMENTS.

a. INSTALLATION OF RADIO FREQUENCY TUNER HOUSING AND ANTENNA CONTROL UNIT.

(1) The radio frequency tuner housing, which supports the antenna is secured to a 12 x 12 inch steel plate. If the housing is mounted against a vertical surface, the steel plate should be welded in position with the access door facing outward. Gussets welded on either side of the plate will not interfere with maintenance. Two holes must be made in the tuner housing, one for the RG-12/U RF cable (not furnished), the other for the 8 conductor, shielded control cable (not furnished). Both cables must enter the tuner housing through stuffing tubes. The cables can enter the tuner housing wherever they will not prevent the removal of the R.F. Tuner.

(2) The end of the RG-12/U cable which enters the tuner housing should be terminated with a UHF male connector, type PL-259 (supplied). The cable is connected to the R.F. tuner by means of a UHF female connector, type SO-239, equipped with a length of shielded lead (supplied). The shielded lead will have to be cut to size and connected to E202 and the shield grounded at the ground lug located directly below E202.

(3) The receiver end of the RG-12/U cable is terminated with a type G.R. female connector (not supplied). If it is desired to use the AN/SRA-17A with a VLF/LF receiver other than the RBA, it may be necessary to use a different fitting.

(4) The AN/SRA-17A was designed to use 100 feet of RG-12/U cable between tuner and receiver. It is preferable to keep the cable less than 150 feet long. Satisfactory performance will be obtained with lengths up to 300 feet.

(5) One end of the 8 conductor cable which enters the R.F. tuner housing should be stripped ½ inch of its outer sheath. Strip each conductor back 3/16 inch and tin leads.

(6) Disassemble S201 as follows: Remove the spring support studs from the chassis with a 3/16 inch open end wrench; remove the two pan head screws securing the shell to the connector; lift shell from connector.

(7) Run cable thru cable clamp and shell.

(8) Solder the 8-conductor cable to connector as shown in fig. 2-1.

(9) Reassemble connector making certain that the cable is facing the direction of the stuffing tube.

CAUTION

DO NOT USE MORE THAN 15 FT./LBS OF TORQUE WHEN TIGHTENING THE 14 NUTS SECURING THE ACCESS DOOR ON THE RADIO FREQUENCY TUNER HOUSING.

b. INSTALLATION OF ANTENNA

Antenna AT-924A/SR is mounted on the tuner housing by six half-inch bolts welded to the steel plate. The tuner housing is shipped with the antenna insulator bolted on the plate. The insulator must be removed to attach the whip antenna to it. A 5 inch flexible antenna lead must be attached to the antenna before the insulator is again mounted on the R.F. tuner housing. The other end of the antenna lead should be connected to insulator E201 in the center of the R.F. tuner chassis.

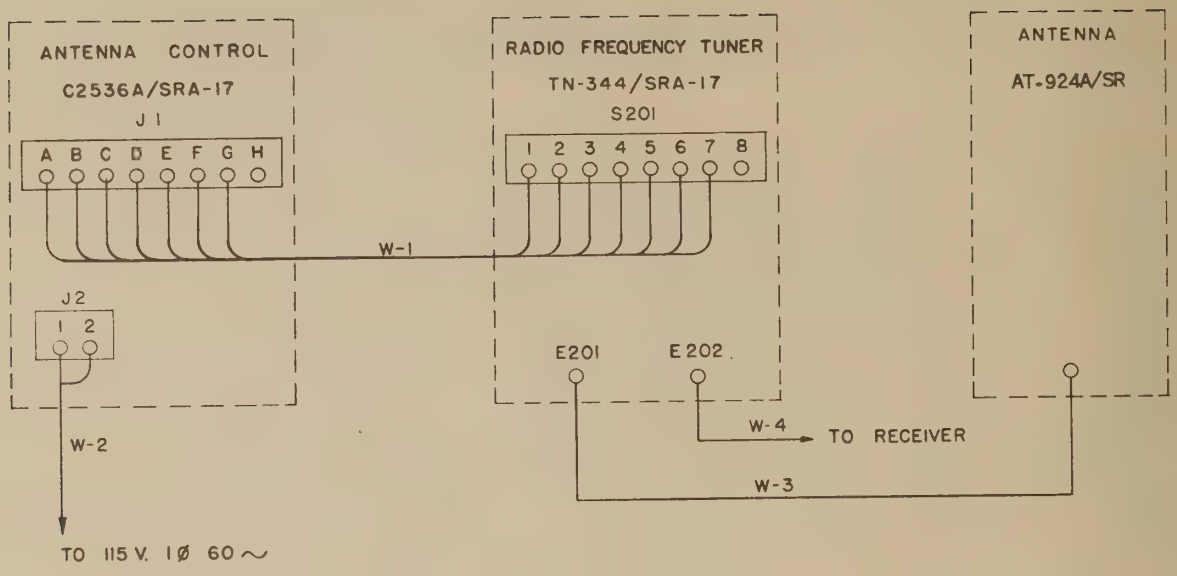
See fig. 2-2 for assembly of parts.

NOTE

Lubricate 'O' Rings with DC-4 compound or equal before installation. The 'O' Ring mounting surfaces must be smooth, free of chips, and foreign material.

2-5. PREPARATION FOR RESHIPMENT.

Remove Antenna AT-924A/SR from the insulator, replace insulator onto R.F. tuner housing and tighten bolts securely. Protect insulator with corrugated cardboard or equivalent. Protect antenna from deformation due to rough handling. Mark the box containing technical manuals "TECHNICAL MANUALS INSIDE".



SYMBOL	NAVY TYPE	NO. ACT. COND.	COLOR	PAIR	FROM	JACK PLUG	PIN	TO	JACK PLUG	PIN	FUNCTION	COND. AMP.	SUPPLIED BY
W-1	TTRSA-4	7	WT.	1	ANT. CONTROL	J1	A	RF. TUNER	S201	1	GROUND		INST. ACTIVITY
			WT.	2		P1	B			2	INCREDUCTOR CONTROL CURRENT	.04 AMP	
			BLK.	2			C			3	RELAY CONTROL 80V.	8 MA	
			WT.	3			D			4	NOISE GENERATOR 105 V.	—	
			BLK.	3			E			5	RELAY CONTROL 80V.	8MA	
			WT.	4			F			6	RELAY CONTROL 80V.	8MA	
			BLK.	4			G			7	RELAY CONTROL 80V.	8MA	
W-2	DCOP-2	2	WT.			J2	1	115 V.	—	—	AC. POWER SUPPLY	—	INST. ACTIVITY
			BLK.			P2	2	1 Ø 60 ~					
W-3	—	1	BLK.		E 201	—	-	ANT	—	—	SIGNAL COUPLING	—	CONTRACTOR
W-4	RG-12/U	COAX.	INNER SHIELD		E 202	J201 P201	CENTER SHELL	RECEIVER	SEE NOTE 1		SIGNAL COUPLING GROUND	—	INST. ACTIVITY

Figure 2-1. Antenna Group AN/SRA-17A Interconnecting Diagram.

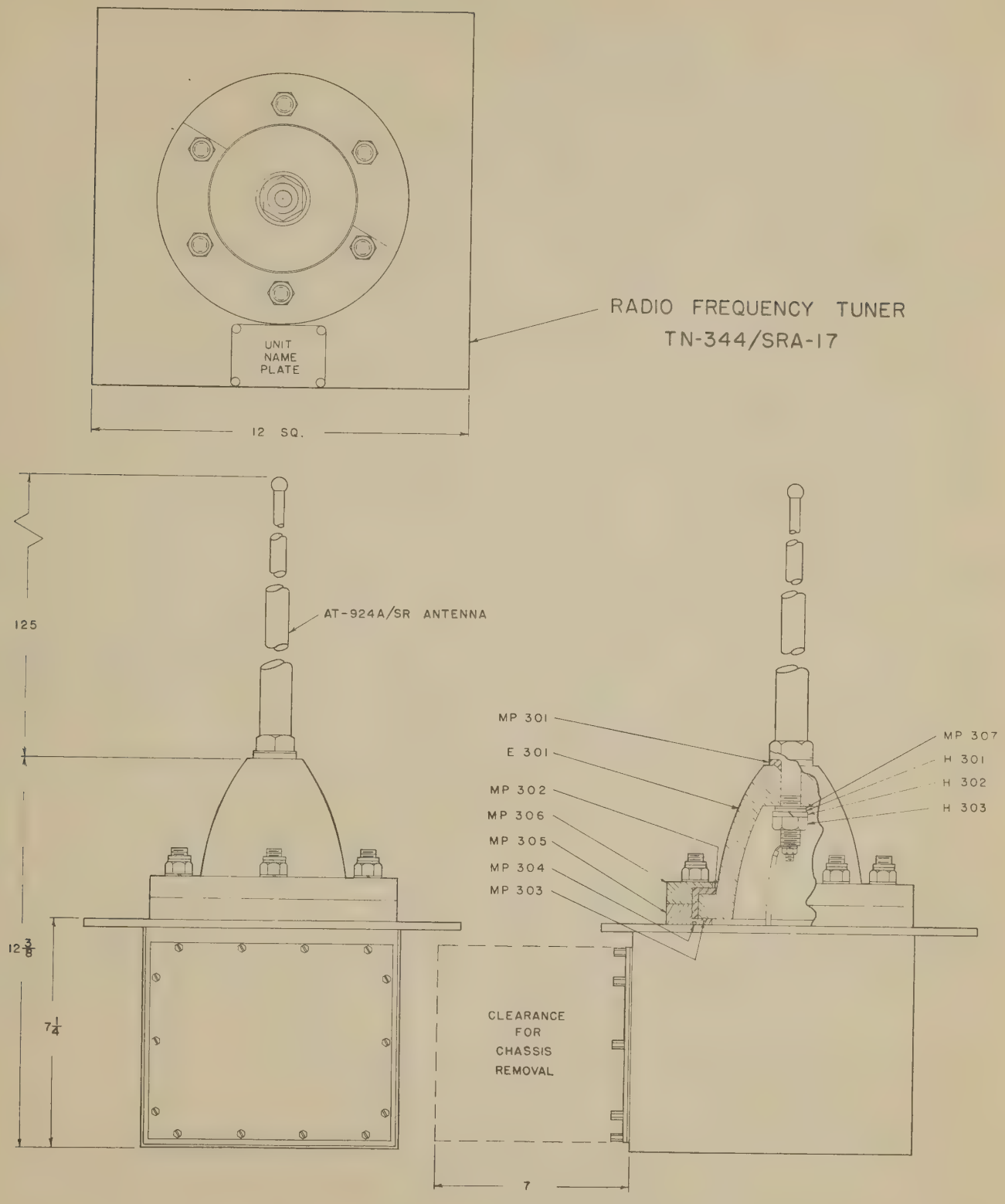
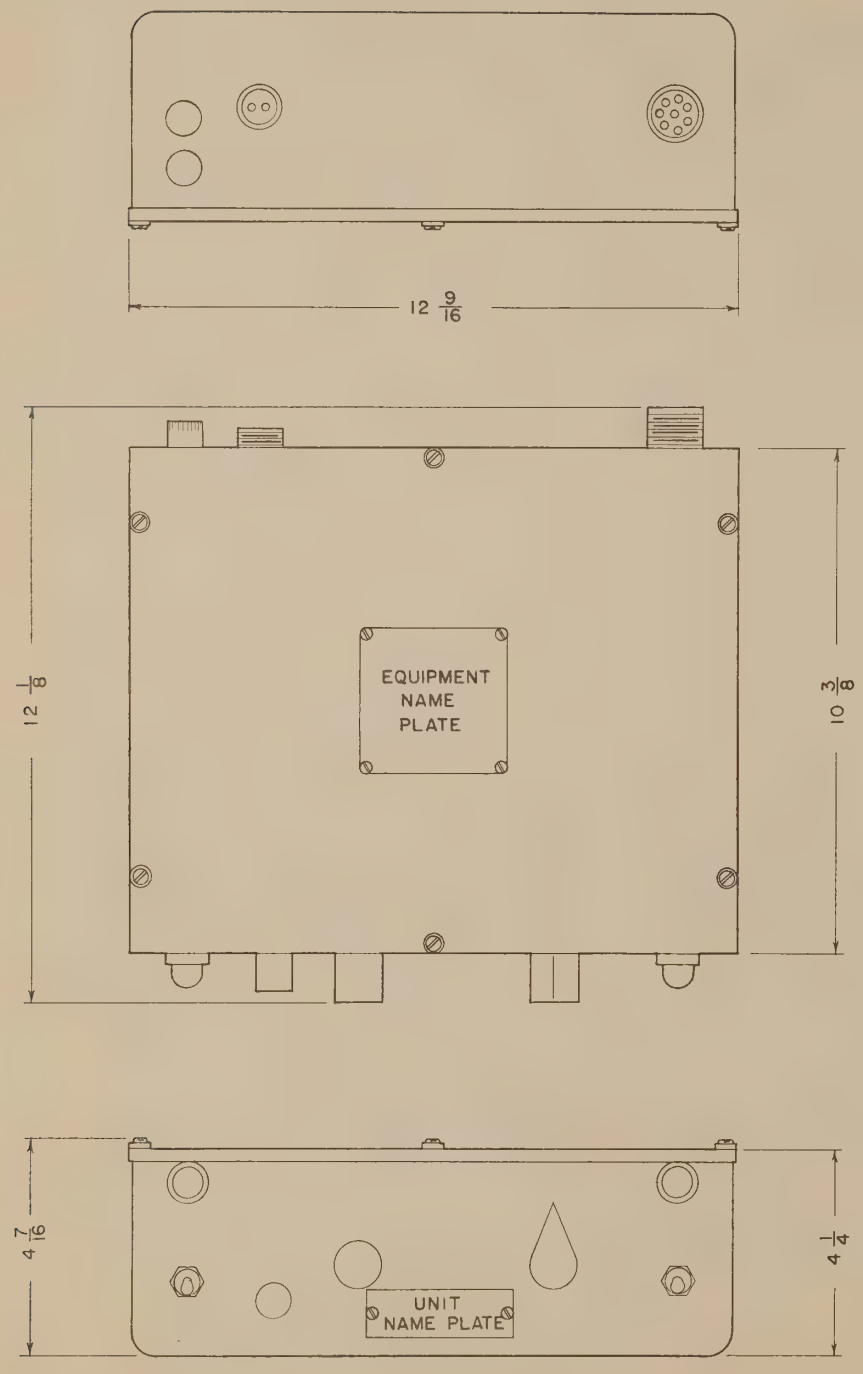


Figure 2-2. Radio Frequency Tuner TN-344/SRA-17 Outline Drawing.



ANTENNA CONTROL
C-2536A/SRA-17

Figure 2-3. Antenna Control C-2563A/SRA-17A Outline Drawing.

SECTION 4

PRINCIPLES OF OPERATION

4-1. OVERALL FUNCTIONAL DESCRIPTION.

Antenna Group AN/SRA-17A is divided for circuit discussion into (1) antenna control unit, (2) radio frequency tuner unit, and (3) noise generator circuit.

a. ANTENNA CONTROL UNIT.–The antenna control unit provides d.c. power to the radio frequency tuner through an 8-conductor shielded cable. A steady drain of approximately 10 milliamps is taken from the unregulated portion of the antenna control circuit for operation of relays K201, K202, and K203 in the R.F. Tuner. The relays, which have their coils in series, are actuated through the range selector Switch S3. To keep a constant 10 ma drain, a resistor having equivalent coil resistance is switched into the circuit when a relay is switched out.

The regulated output (105 volts) of the antenna control unit supplies current for the control windings of the variable inductors L201 and L202. The control winding current can be varied from 0 to 30 ma maximum by tuning potentiometer R6A-B. The tuning potentiometer is varied to resonate the inductor-antenna series circuit. Resistors R11, R12, and R13 in the increductor control winding circuit are used to give a bandspread effect for ease in tuning. A regulated voltage is also supplied for operation of the noise generator.

b. RADIO FREQUENCY TUNER.–The radio frequency tuner series tunes the antenna at its base through variable inductor L201 or L202.

The Increductor (variable inductor) consists of a signal winding and a control winding. These two windings are wound over a special ferro-magnetic core material. They are separated by an electrostatic shield to prevent capacitive coupling. Varying the d.c. current through the control winding changes the permeability of the core material and the inductance of the signal winding.

Increductor L201 has a starting inductance (with 0 control current) of 20 millihenries, L202 a starting inductance of 500 millihenries. Increasing the control current lowers this inductance. L202 is used in tuning the antenna from 14-95 kc in two ranges. L201 tunes from 95-600 kc, also in two ranges. Four shunt capacitors, C202 through C205, connected from the antenna side of the signal winding to ground, are used in conjunction with L201 and L202 to increase the starting control current. One is used for each frequency range. This increased current permits tuning at high ambient temperatures.

c. NOISE GENERATOR CIRCUIT.–CR201, a IN21B silicon diode, generates the r.f. noise supplied by the noise generator. Silicon diodes have the property of generating considerable r.f. noise when current is passed through them in the reverse direction, but this reverse current must be kept low in order to prevent damage to the crystal.

The noise generator circuit is mounted on terminal board TB202 in the R.F. tuner chassis. It consists of four components in addition to the diode: C206, C207, R201, and R202. Resistor R201 is the output impedance of the Noise Generator. Resistor R202 limits the current through CR201 to 1.0 milliampere. The generated noise is coupled to the increductor signal winding through the dummy antenna capacitor C206, substituted for antenna AT-924A/SR when the noise generator is in operation. Capacitor C207 acts as a by-pass to isolate the noise generator from the power supply.

By means of the noise source it is possible to tune the actual antenna to a specific frequency quickly and accurately without the aid of a frequency calibrated dial on the antenna control unit. The noise source may also be used as a maintenance tool for rapidly checking the performance of the Antenna Group and associated receiver. See page 3-1.

SECTION 5
TROUBLE SHOOTING

5–1. SAFETY NOTICE.

NOTICE

The attention of the Officers and operating personnel is directed to Chapter 67 of the Bureau of Ships Manual or superseding instructions on the subject of radio safety precautions to be observed.

This equipment employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working at equipment maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe safety regulations. Do not change tubes or make adjustments inside the equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. Always remove power and discharge circuits to ground.

5–2. GENERAL.

a. ANTENNA AT-924A/SR–No maintenance is required by the antenna except for periodic checks of the insulator. The insulator should be cleaned regularly to remove deposits of soot or salt film that might eventually form a path to ground.

b. ANTENNA CONTROL AND RADIO FREQUENCY TUNER.–Maintenance of the antenna control and radio frequency tuner is largely a matter of routine checking and component replacement.

5–3. OVERALL TROUBLE SHOOTING.

a. PRELIMINARY CHECK.–Turn on equipment. If equipment is completely inoperative check fuses and power source. For fuse and tube location see figure 6-2. Check all cables for proper mating.

b. TEST EQUIPMENT AND TOOLS.–No special tools are required to service this equipment. A Multimeter AN/PSM-4B will be required to measure voltages and resistances accurately.

5–4. FUNCTIONAL TROUBLE SHOOTING.

The following tables of resistance and voltage measurements will be helpful in determining which unit and component is malfunctioning. Any deviation of approximately 20 per cent or more from the values indicated will disclose a possible source of trouble.

TABLE 5-1. ANTENNA CONTROL RESISTANCE MEASUREMENTS

PIN	POSITION OF RANGE SELECTOR SWITCH S-S			
	14-38 kc	38-95 kc	95-235 kc	235-600 kc
Noise Generator switch in OFF position				
A	0	0	0	0
B	9100	6400	6000	4000
C	Open	10000	10000	Open
D	Open	Open	Open	Open
E	Open	Open	23000	14000
F	Open	24000	Open	10000
G	Open	Open	Open	Open
H	Open	Open	Open	Open
Noise Generator switch in ON position				
A	0	0	0	0
B	9100	6400	6000	4000
C	Open	Open	Open	Open
D	4500	4500	4500	4500
E	Open	Open	23000	14000
F	Open	23500	Open	Open
G	3400	Open	Open	Open
H	Open	Open	Open	Open
All Readings in Ohms				

Conditions: Tuning potentiometer turned fully clockwise. Equipment off. Readings taken from pins of power output receptacle, J1, to ground.

The parts list section has been corrected by means of the following supplementary table. Always refer to the appropriate supplementary table for a given item first as it completely supersedes any corresponding listing in the basic table. If no information is shown for a given item, then refer to the basic table for the required information.

NOTE

"The stock numbers and support information that appear in this section have been revised. For Federal Stock Numbers and Source, Maintenance and Recoverability Codes refer to the Appropriate Stock Number Identification Table (SNIT) issued by the Electronics Supply Office. The SNIT rather than this publication, shall govern if there is any conflict between stock numbers and support information.

TABLE 7-2A TABLE OF REPLACEMENT PARTS

ANTENNA AT-924/SR

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
301-399		ANTENNA: 14 to 600 kc frequency range. Navy type no. AT-924A/SR	receiving antenna
E301		INSULATOR, STANDOFF: ceramic, glazed per JAN-1-10 NAVY type no. 61277 modified per Lieco Dwg. 340-WAM-002	mounting insulator for whip antenna
H301		WASHER, C.R.E.S. 5/8 in ID; AN 960-C1016	back up washer for MP307
H302		WASHER LOCK: C.R.E.S. 5/8 in ID; heavy, split.	lock washer for H303
H303		NUT: plain, hex; C.R.E.S.; 5/8-18 thread:	retain whip antenna
MP301		GASKET: syn. rubber per MIL-R-900; 1 3/8 in OD; .625 in ID; 3/8 in thk; 45° x 3/16 in chamfer from ID. Lieco part no. 340-WAM-004.	Antenna seal
MP302		SPACER: Dupont neoprene compound 11-002 70 dur. U cup packing 6 1/4 in. nom. size, modified to add 5 in dia hole. Linear series 14.	Restrain E301
MP 303		GASKET: O ring; syn. rubber per MIL-R-6855, class II; 5.359 in ID; .070 in thk.	Seal for E301
MP304		GASKET: O ring; syn. rubber per MIL-R-6855. Class II; 6 in ID; .070 in thk.	Seal for MP305
MP305		RING, MOUNTING: bottom; part of AT-252/SR Antenna, modified to add two O ring grooves. Lieco dwg. 340-WAM-001.	Antenna mounting ring
MP306		RING, MOUNTING: top; part of AT-252/SR Antenna.	Same as MP305
MP307		GASKET: cloth impregnated neoprene; single hole 0.640 in; 1.188 in dia. x 1/8 in thk.	Gasket for whip antenna

SECTION 7
PARTS LIST

7-1. INTRODUCTION.

Reference designations have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment and are included on drawings, diagrams and the part list. The letters of a reference designation indicate the kind of part, such as resistor, amplifier, electron tubes, etc. The number differentiates between parts of the same genetic group. Parts of the same first major units are numbered from 1 to 199; parts of the second 201 to 299, etc. Sockets associated with a particular plug in device, such as an electron tube or fuse, are identified by a reference designation of the plug in device. For example, the socket for fuse F-7 is designated XF7.

7-2. LIST OF MAJOR UNITS.

Table 7-1 is arranged by groups of reference designations that apply to a major unit.

7-3. MAINTENANCE PARTS LIST.

Table 7-2 lists all major units and their maintenance parts. The parts of each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the various parts in alphabetical and numerical order. Column 2 refers to the explanatory notes that appear in 7-5 below. Column 3 gives the name and describes the various parts. Complete information is given for all key parts (parts differing from any part previously listed in this table) and sub-key parts (parts identical with a key part but appearing for the first time for a major unit). The name and description are omitted for other parts. However, reference is made to the key part or sub-key part for the data. Column 4 indicates how the part is used and gives its functional location in the equipment.

7-4. STOCK NUMBERS.

Stock numbers of parts used in this equipment can be obtained by referring to the Stock Number Identification Table (SNIT) published by E.S.O.

7-5. NOTES.

The following provide additional information about items listed in table 7-2.

1. If exact replacement is not available replace with resistor made up of the following:

   a. RESISTOR. 1850 ohm 20 watt ww
      N.S. FL213-16-R-21300-64

   b. RESISTOR. 1750 ohm 20 watt ww
      N.S. FL213-16-R-21300-61

7-6. LIST OF MANUFACTURERS.

Table 7-3 lists manufacturers of parts used in the equipment. The first column includes the abbreviations used in table 7-2 to identify manufacturers.

TABLE 7-1. ANTENNA GROUP AN/SRA-17A, LIST OF MAJOR UNITS

REF. DESIG.	QUANTITY	NAME OF MAJOR UNIT	DESIGNATION	COLLOQUIAL NAME	PAGE
1 - 99 201 - 299 301 - 399	1 1 1	Antenna Control Radio Frequency Tuner Antenna	C-2536A/SRA-17 TN-344/SRA-17 AT-924A/SR		

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

ANTENNA CONTROL C-2536A/SRA-17

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C1A, B		CAPACITOR, FIXED, ELECTROLYTIC: 450 vdc, each section; two 10 uf sections; metal case; uninsulated; 1-3/8 in. dia, 2-1/4 in. lg; 7/8-16 thd, 1/2 in. lg threaded mounting section. MIL-C-62 type no. CE42F100R.	Power Supply Filter

TABLE 7-2. ANTENNA GROUP AN/SRA-17A, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C2		CAPACITOR, FIXED, PAPER DIELECTRIC: 600 vdc; .01 uf ± 10%; metal case; plastic insulated; hermetically sealed; .375 in. dia, 15/16 in. lg. MIL-C-25 type no. CP09A1KF103K.	R.F. By-pass
C3		CAPACITOR, FIXED, PAPER DIELECTRIC: 200 vdc; .22 uf ± 10%; metal case; plastic insulated; hermetically sealed; .463 in. dia, 1-7/16 in. lg. MIL-C-25 type no. CP05A1KC224K.	R.F. By-pass
DS1		LAMP, INCANDESCENT: 6-8 v; T-3-1/4; min. bayonet; SC; clear. MS 155710 (Ships). General Electric type no. 47.	Power Indicator
DS2		Same as DS1	Power Indicator
F1		FUSE, CARTRIDGE: 1 amp; 1-1/4 in. lg, 1/4 in. dia. MIL-F-16160 type no. MS 90079-20-1.	AC Line Fuse
F2		Same as F1	AC Line Fuse
H1		SCREW, EXTERNALLY RELIEVED BODY: brass; zinc plated; 8-32 thd, .586 in. lg, .397 in. lg; undercut head; flat black enamel. Lieco part no. 344NAG013.	Retains Cover Panel
H2		NUT, PLAIN, KNURLED: brass; zinc plated; .250 in. OD, 8-32 thd, .046 in. thk. Lieco part no. 344NAG014.	Retains H1
H3		WASHER, NON-METALLIC: Syn. rubber per MIL-R-900; 7/16 in. OD, 1/8 in. ID, 1/32 in. thk.	Seal for H1
J1		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric. MIL-C-5015 type no. AN3102A-18-8S; general purpose.	Power output connector
J2		CONNECTOR, RECEPTACLE, ELECTRICAL: low loss plastic dielectric. MIL-C-5015 type no. AN3102A-14S-9P; general purpose.	AC input connector
L1		REACTOR: One coil; 10H inductance; 85 madc; 175 ohms DC resistance. MIL-T-27 type no. TF1A04YY; Chicago Transformer Co. no. RH1085.	B+ Filter choke
MP1		RETAINER, ELECTRON TUBE: small shell octal, RETMA tube base retained. MIL-STD-242 type no. 804.5-1R; general purpose.	Retains V2
MP2		RETAINER, ELECTRON TUBE: intermediate shell octal, RETMA tube base retained. MIL-STD-242 type no. 804.5-3R; general purpose.	Retains V1
MP3		STRAP, RETAINING: brass; zinc plated; 12 gage, 1/2 in. w, 3.825 in. h, 3.3 in. gap. Lieco part no. 344NAG016.	Retains T1
MP4		MOUNT, RESILIENT: syn. rubber per MIL-R-900; 3 in. w, 4 in. lg, 1/4 in. thk. Lieco part no. 344NAG015.	Vibration isolator for T1
MP5		GASKET: syn. rubber per MIL-R-900; 1-3/8 in. sq., 1/16 in. thk; 1/8 in. dia holes in corners; one hole 7/8 in. dia in center. Bendix part no. 10-40450-18.	Chassis seal for J1
MP6		GASKET: syn. rubber per MIL-R-900; 1-1/8 in. sq., 1/16 in. thk; 1/8 in. dia holes in corners; one hole 3/4 in. dia in center. Bendix part no. 10-40450-14.	Chassis seal for J2